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# Final Environmental Impact Report & Statement

San Francisco  
Wastewater  
Master Plan May 1974

Implementation Program I  
North Point Transport Project

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City and County of San Francisco  
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# DEPARTMENT OF CITY PLANNING

100 LARKIN STREET - SAN FRANCISCO, CALIFORNIA 94102

January 25, 1975

CITY PLANNING COMMISSION  
NOTICE OF HEARING ON DRAFT  
ENVIRONMENTAL IMPACT REPORT  
FOR THE FOLLOWING PROPERTY:


All of Assessor's Blocks 5201, 5211, 5212, 5215, 5216,  
5217, 5226, 5227, 5228, 5233, 5234, 5243, 5244, 5252,  
5280; portions of Assessor's Blocks 5232, 5304, 5313.

Notice is hereby given to the general public as follows:

1. A draft Environmental Impact Report has been prepared by the Department of City Planning in connection with the Wastewater Master Plan, Implementation Program No. 2. Southeast Dry Weather Expansion and Interim Bay Outfall.

The report is available for public review and comment at the Department offices at 100 Larkin Street.

2. A public hearing on this draft Environmental Impact Report and other matters will be held on Thursday, March 20, 1975 beginning at 2:30 P.M., in Room 282, City Hall.

  
Selina Bendix, Ph.D.  
Environmental Review Officer

EE74.158

Enclosure



FINAL

ENVIRONMENTAL IMPACT REPORT AND STATEMENT  
(D-EPA-24003-CA)

SAN FRANCISCO WASTEWATER MASTER PLAN  
MAY 1974

IMPLEMENTATION PROGRAM 1  
NORTH POINT TRANSPORT PROJECT

SCH 74040876

Prepared by:

U. S. Environmental Protection Agency  
Pacific Southwest, Region IX  
100 California Street  
San Francisco, CA 94111

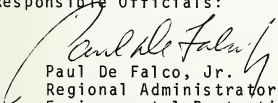
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Department of City Planning  
100 Larkin Street  
San Francisco, CA 94102

With technical assistance by:


City and County of San Francisco  
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Spectrum-Northwest


Responsible Officials:



Paul De Falco, Jr.  
Regional Administrator  
Environmental Protection Agency  
Region IX



Selina Bendix, PhD  
Environmental Review Officer  
City and County of San  
Francisco



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# ABSTRACT

## ENVIRONMENTAL IMPACT REPORT AND STATEMENT

Draft ( )

Final (X)

Prepared jointly by:

City and County of San Francisco  
Department of City Planning  
100 Larkin Street  
San Francisco, California 94102

U. S. Environmental Protection Agency  
Pacific Southwest, Region IX  
100 California Street  
San Francisco, California 94111

1. Type of Action:

Administrative

2. Description of Project:

The San Francisco Master Plan for Wastewater Management is a concept which includes a combination of pumps, pipes, storage reservoirs, treatment plants, and disposal locations which it is believed most effectively reduces the detrimental effects of waste discharges from the City and County of San Francisco. The Master Plan will be constructed in four stages during the next 20 years.

Implementation of the first stage of the Master Plan is necessary to comply with provisions of the Federal Water Pollution Control Act Amendments of 1972 and existing Cease and Desist Orders of the California Regional Water Quality Control Board, San Francisco Bay Region, which require secondary treatment of all dry weather flows by July 1, 1977.



Upon completion of the Master Plan, wastes will receive secondary treatment at the Southeast and Richmond-Sunset plants. Effluent from these plants will be transmitted through a tunnel and pipeline system to the southwest corner of the City and discharged approximately four miles offshore. During storm conditions, flows exceeding the capacity of the secondary treatment plants will be transported to the 1,000 mgd capacity Southwest Treatment Plant where it will receive Level I (low dose ferric chloride) treatment and be discharged about two miles offshore.

Implementation Plan I, North Point Transport Project, is scheduled for construction in 1974. The North Point Transport Project will convey untreated wastewater from the existing North Point Water Pollution Control Plant to the Southeast Water Pollution Control Plant which will allow conversion of the North Point plant to a wet weather treatment facility.

### 3. Summary of Environmental Impacts:

- A. Construction impacts will occur in almost every area of the City--land use changes, traffic disruption, noise, dust, flora and fauna disruption, aesthetics, utility disruption, and temporary turbidity increases in the Bay and Ocean waters.
- B. Interim discharge of combined North Point and Southeast secondary treated effluent into South San Francisco Bay.
- C. Elimination of the North Point primary discharge to San Francisco Bay.
- D. Control of wet weather flows along the northeast shoreline at completion of Stage I resulting in only five wet weather overflows per year.
- E. Control of wet weather flows City-wide at completion of the Master Plan resulting in only eight wet weather overflows per year.
- F. Master Plan provides secondary treatment of all dry weather flow and discharge to the Pacific Ocean through a five-mile outfall.

- G. Capacity of the treatment facilities will not allow for population growth beyond that compatible with the applicable air implementation plan prepared pursuant to the Clean Air Act Amendments of 1970. Secondary impacts in this area are expected to be minor.

4. Alternatives:

- A. No Project
- B. Many Individual Treatment Plants
- C. Expansion of Three Existing Plants
- D. One Regional Plant Without Wet Weather Storage
- E. Sewer Separation
- F. Reclamation

5. Dates Available to CEQ and the Public:

Draft: March 13, 1974

Final: May 24, 1974

6. Distribution List Attached



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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX  
100 CALIFORNIA STREET  
SAN FRANCISCO, CALIFORNIA 94111

FOREWARD FROM THE ENVIRONMENTAL PROTECTION AGENCY

The Environmental Impact Report and Statement (EIR&S) was prepared jointly by the City and County of San Francisco and our agency on the City's Master Plan for Wastewater Management.

The EIR&S is in two volumes. The first evaluates the overall environmental effects of the Master Plan for Wastewater Management while the second evaluates the specific environmental effects of Implementation Plan I, North Point Transport Project, scheduled for construction in 1974. This transport project is part of the Master Plan's Stage I facilities.

The EIR&S has been prepared to fulfill the mandate of both State and Federal legislation which requires that consideration of environmental aspects be built into the decision making process. This legislation includes the California Environmental Quality Act (CEQA) of 1970 and the National Environmental Policy Act (NEPA) of 1969.

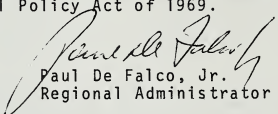
EPA is considering assisting the City and County of San Francisco in constructing the North Point Transport Project. A final decision on this action will not be made, however, until at least 30 days after the release of this document.

Upon reviewing the Master Plan and preparing the joint EIR&S, we have found that the concepts of the Master Plan are generally acceptable. More specifically, we find that the concepts of storage, transport, upgraded treatment and disposal appear to be the most acceptable approach to solving San Francisco's wastewater problems.

However, there remains several major issues which will need to be explored before a number of the Master Plan concepts can be implemented. These include the proper location and sizing of holding basins, the location of outfalls, the proper level of treatment for discharges to San Francisco Bay and the acceptability of allowing eight overflows per year of untreated wastewater.

Although these questions remain, it is possible to proceed with several projects without committing the City and County of San Francisco to implement the entire Master Plan. The North Point Transport Project, if approved, would only commit the City to consolidate wastewater treatment for most of the City's dry weather flows at the Southeast Plant. Other elements of the Master Plan are to varying degrees independent of this action.

As EPA is asked to fund the construction of future projects, we will re-evaluate both the proposed project and the Master Plan concept as part of our actions to comply with the National Environmental Policy Act of 1969.



Paul De Falco, Jr.  
Regional Administrator

## C O N T E N T S

INTRODUCTION .....	1
CHAPTER I .....	1
Background .....	1
Project Goals .....	4
CHAPTER II.....	5
Environmental Setting .....	5
Topography .....	5
Geology .....	6
Land Use .....	6
CHAPTER III .....	8
Selection Process .....	8
CHAPTER IV .....	10
The Best Apparent Method .....	10
CHAPTER V .....	12
Environmental Impacts .....	12
Impacts of the Best Apparent Method .....	13
North Point Pump Station .....	13
North Point Pump Station to The Embarcadero - 36" Force Main .....	14
Embarcadero to 7th and Howard - 36" Force Main .....	15
Howard to Berry on 7th - 36" Force Main .....	16
Fourth Street Pump Station .....	17
Berry Street from 4th to Channel Street - 24" Force Main .....	18
Channel Street Pump Station .....	19
Sewer Diversions .....	21
Work Common To All Alternatives .....	22
CHAPTER VI .....	25
Alternatives .....	25
Null Alternative - No Project .....	25
The Embarcadero Route .....	28
The Tunnel Route .....	30
The Inland Route .....	32



The Remote Pump Station Route .....	34
CHAPTER VII .....	37
Mitigation Measures .....	37
Traffic.....	37
Noise .....	38
Air .....	39
Utilities .....	39
Site Excavations.....	40
Aesthetics .....	40
Construction within existing North Point Main .....	40
Measures taken to reduce operational impacts .....	41
CHAPTER VIII .....	42
Seismic and Geologic .....	43
Faults .....	43
Design Considerations .....	48
CHAPTER IX .....	49
Local Short-Term Uses vs. Long Term Productivity .....	49
Irreversible Environmental Changes .....	49
Growth Inducing Impacts .....	50
Cost Effectiveness .....	50
Basic Alternatives .....	52
Benefits Which Can Be Accrued From Completion Of The Project .....	53
SUMMARY OF COMMENTS RECEIVED .....	56
EIR AUTHORS AND CONTRIBUTORS .....	60
BIBLIOGRAPHY .....	61

## LIST OF PLATES, FIGURES AND TABLES

PLATE I	.... Best Apparent Project Route .....	Fold Out
PLATE II	... Best Possible Alternative Routes ...	Fold Out
FIGURE 1	... North Point Watershed	
2	... Best Apparent Method	
3	... Site Location - North Point Pump Station	
4	... North Point Sewer Main Showing Proposed 36" Force Main	
5	... Proposed Site Location - Channel Street Pump Station	
6	... Perspective - Channel Street Pump Station	
7	... Force Main Crossing of Islais Creek	
8	... Existing Sewer Outfall at Headend of Channel Street	
9	... Force Main Crossing of Channel Street	
10	... Geologic Map and North Point Transporter	
TABLE 1	... Summary of Best Apparent Project	
2	... Typical Construction Equipment Noise Ranges	
3	... Transit Use Patterns	
4	... Vehicle Use Patterns	
5	... Summary of Alternatives	
6	... Cost Analysis of Alternatives	



## Introduction

This volume of the San Francisco Wastewater Management Master Plan Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) discusses the North Point to Southeast Transporter Implementation Program No.1.

Implementation Program No.1 is an operational element of the Wastewater Management Master Plans' Phase I and involves extensive modification and improvements of existing San Francisco wastewater collection and transport facilities and construction of several new facilities.

The North Point-Southeast Transporter's anticipated environmental impacts and its role in meeting the goals and requirements of the San Francisco Master Plan for Wastewater Management will be discussed.



## CHAPTER I

### Background

Currently, the North Point sewage service area services a resident population of 350,000 persons. It is by far the largest drainage service area in the City of San Francisco. The sanitary wastewater flows from this area average 60 million gallons per day (MGD). This sewage is collected through a series of sewers and collectors and transported to the North Point Water Pollution Control Plant for treatment.

The North Point treatment facility provides conventional primary treatment plus chemical coagulation with ferric chloride. Individual processes include prechlorination, screening, grit removal, preaeration, primary sedimentation with chemical coagulation and dechlorination. The resulting effluent is discharged from four - 48-inch cast iron lines under Piers 33 and 35 which terminate about 800 feet offshore and 10 feet below mean lower low water.\*

The boil resulting from this discharge is clearly visible from the ends of Piers 33 and 35 at all times, and floating material is frequently seen. In addition, obnoxious odors are

---

\* There are two unequal low tides per day in San Francisco Bay - mean lower low water is the arithmetic mean of the lowest of these two.

frequently detected.

These conditions have been the subject of several Cease and Desist orders issued by the California Regional Water Quality Control Board (RWQCB), the latest of which is "C & D" - #71-77 issued in October 1971. This order, entitled "Waste Discharge Requirements for the City and County of San Francisco; North Point Sewage Treatment Plant", requires that the discharge from the North Point sewage plant not cause; in the waters of the State, floating or deposited macroscopic particulate matter, alteration of color, oil, dissolved oxygen below 5 mg/l, dissolved sulphide concentrations greater than 0.1 mg/l or any substance in concentrations that impairs beneficial uses or makes aquatic life unfit for human consumption.

Although the plant is rated at a hydraulic capacity of 190 mgd, flow into the plant is throttled when it exceeds 160 mgd, and frequently at lesser rates, owing to the inability of the bar screens to handle the screenings. This condition occurs frequently during the wet weather months, when the storm runoff and the ever present dry weather flows are transported within the combined system to the plant.

When rainfall in the North Point drainage district exceeds 0.02 inches per hour, the combined flows exceed the plant's hydraulic capacity. This condition occurs approximately 3 percent of the time. Once this point is reached, the combined sewage begins to flood, or back up through the existing transporter.



During these heavy flow situations, the transporter is relieved by several outfalls which discharge raw waste directly to the receiving waters of the Bay.

The North Point system is partially responsible for the City of San Francisco Health Department's estimate that the beaches of San Francisco are unsafe for water contact recreational activities 171 days per year.

To correct this condition and to comply with RWQCB requirements, several alternative plans were proposed.

One considered was the expansion and upgrading of existing treatment facilities at North Point which would require a substantial purchase of expensive, commercially zoned, adjacent property. Additionally, a new Bay outfall would have to be constructed that would require the excavation and disposal of approximately 150,000 cubic yards of bottom material, and would adversely affect the resident benthic community by displacement, turbidity of the immediate waters, and increased settleable materials during construction. Although these impacts would be temporary, permanent environmental changes could occur.

The expansion alternative was discarded as too costly from an ecological and financial standpoint.

Several other alternatives were considered and discarded. A detailed discussion of these alternatives and the evaluation criteria utilized for final determinations can be found in the

Wastewater Management Master Plan EIR/EIS. The project selected as most feasible was the transportation of the Northeast drainage district's dry weather sanitary flows to the Southeast plant for treatment and discharge, and the retention of the North Point Water Pollution Control Plant for the treatment of storm or wet weather flows.

### Project Goals

This project will, when completed, eliminate dry weather wastewater discharges to the North shore waters of the City. Additionally, in conjunction with companion projects, this improvement will greatly expand the total systems wet weather capability, thereby drastically reducing the occurrence of overflows. This action will enhance the recreational, scenic and commercial aspects of the Northern San Francisco shoreline and effect partial compliance with the Regional Water Quality Control Board's Cease and Desist order #71-77.

## CHAPTER II

### Environmental Setting

A detailed discussion of the San Francisco Topographical, Geologic, and Land Use features can be found in the Master Plan EIR/EIS. This Chapter will limit its discussion of these subjects to the North Point Drainage District where the bulk of project construction is planned.

### Topography

The North Point Drainage District is a natural drainage basin which follows the slope and contour of the land.

A low spur of the Coast Mountain Range extends northward through the City slightly west of the central axis. The highest City elevations, over 900 feet, occur on this spur, at Mount Davidson, Twin Peaks, and Mount Sutro; the latter two tend to define the western and southern edges of the North Point drainage district. Figure 1 is a map of the North Point drainage district.

Within the district, such well-known hills as Nob, Russian, and Telegraph, run to elevations of about 300 feet, while Polk Gulch and the Market Street Valley, define the lower portions of the district.

Natural drainage is toward the beach on the North and towards a flat coastal strip along the eastern edge of the business district.

## Geology

The North Point drainage district, like the entire City, is literally founded on sand; the peaks being outcrops of bedrock protruding above the rolling hills. The two principal kinds of bedrock underlying the sand are chert, a byproduct of volcanic activity, and sandstone. These comprise the Franciscan formation.

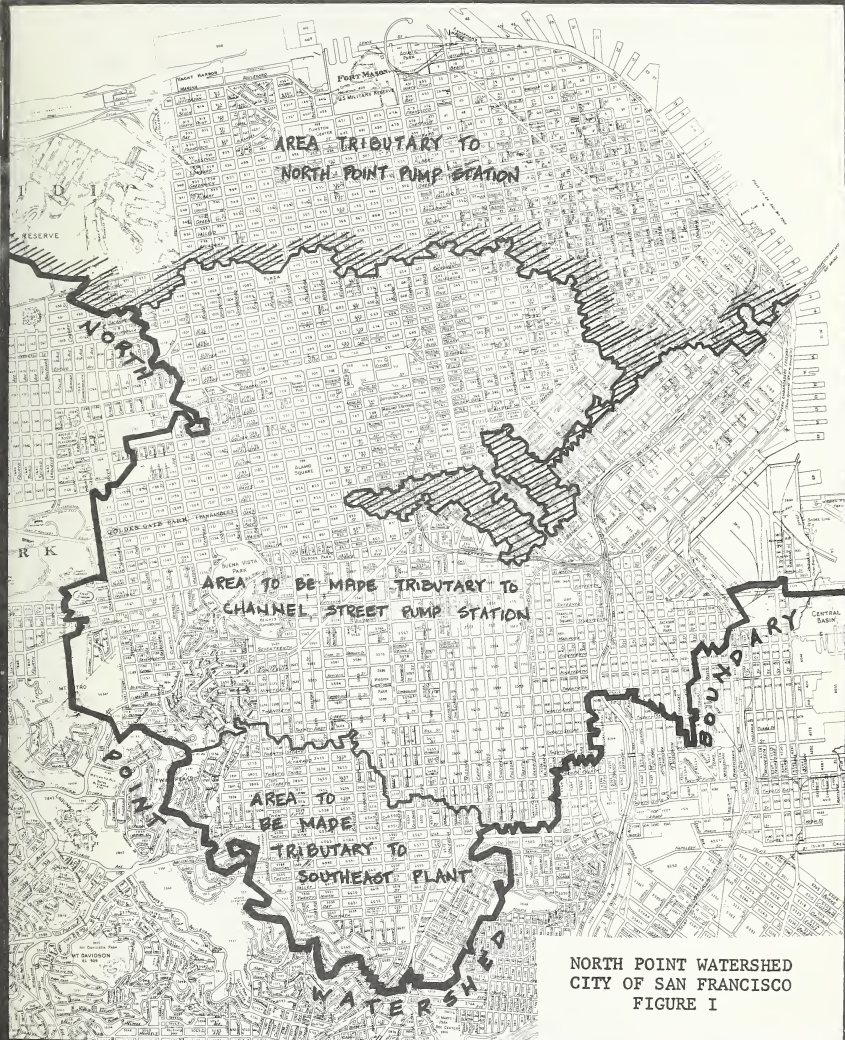
Surface deposits over the Franciscan formation include dune sand, bay mud and clay, slope debris and ravine fill, beach deposits, alluvium, landslide deposits, and artificial fill. A portion of the eastern slope of the North Point drainage district is over Bay mud.

In general, the surface materials are uncemented and easily excavated, but often present other construction problems, such as settling or the running of non-uniformly graded sands.

## Land Use

The North Point District includes the downtown commercial area, with its large daytime work force from all over the Bay area, an industrial area, and a large residential area featuring predominantly multi-family units.

A major portion of the district's coastline falls within the boundaries of the City's Northern Waterfront Planning Area, and is the subject of an element of the comprehensive plan for the City prepared by the Department of City Planning.



NORTH POINT WATERSHED  
CITY OF SAN FRANCISCO  
FIGURE I



At present, industry along the waterfront is being replaced by a variety of commercial activities, and this has resulted in the growth of many mixed use areas.

These mixed use zones and structures have brought about unique combinations of activities which the Northern Water Front Master Plan encourages. Should this Plan achieve its goals, an addition to the average daily sanitary waste flow of 60 mgd stemming from the 350,000 24-hour residents making their home in the North Point drainage district can be anticipated.

The drainage district is comprised of 9,300 acres of which 39% are dedicated to residential use, 31% to industrial/commercial uses, and 30% to Public and Government use.

## CHAPTER III

### Project Description

The North Point to Southeast Transporter Project is designed to transport dry weather sanitary flows originating in the North Point drainage district to the Southeast Water Pollution Control Plant for treatment and discharge.

The concept and necessity of this project is discussed in the San Francisco Wastewater Management Plan EIR.

The project consists of changes in existing sewer connections, construction of new pumping facilities and improvement of some existing pump facilities, and the installation of a force main from the North Point Plant to the Southeast Plant.

### Selection Process

In order to select the best method to achieve the objectives of this project, decision parameters were adopted which reflected the following goals.

- Maximum Cost Effectiveness
- Avoidance of Congested Areas
- Exploitation of the Topographical Features of the North Point drainage area
- Maximum use of existing sewage facilities



- Construction methods least disruptive to normal activities in the immediately adjacent area
- Maximum operational efficiency

The best apparent method and route were selected after reviewing the North Point Transporter System's goals with the intention of minimizing costs, avoiding congested areas, exploiting the geographical and topographical features of the North Point drainage area. The basic approach was maximizing the use of existing sewerage facilities.

This method will minimize construction north of Market Street and reduce the time necessary for a major portion of area flows to be conveyed to the Southeast Plant for treatment. Approximately 70% of the total North Point flow will be conveyed to the Southeast Plant one hour sooner than if it were routed through the existing North Point facility. This feature will reduce the difficulties of treatment and odor control at the Southeast Plant.

The flow from the remaining 30% tributary area would be pumped from the existing North Point facility by a satellite pump station to 7th and Howard Streets in a 36-inch reinforced, plastic mortar, force main installed within the existing North Point Sewer Main. Table I summarizes the prominent construction elements of the best apparent method. Also Figure II and Plate I display the Best Apparent Method.

The Best Apparent Method

The best apparent method is composed of the following construction elements:

Construction of a 33 million gallons per day (mgd) pump station beneath Kearny Street between Bay and Francisco Streets, occupying approximately 6,000 square feet.

Construction of a new 36-inch diameter force main along Francisco, Montgomery and Chestnut Streets to The Embarcadero. This construction element would require open cut trenching.

Construction of a 36-inch diameter force main within the existing North Point main. This type of construction will not require continuous excavation, but only several localized street openings.

Construction of a 36-inch diameter force main on 7th Street from Howard to Berry Street, the site of the proposed Channel Street Pump Station. The construction method to be employed in this element is open-cut trenching. The trench will be approximately 7 feet wide and will be located on the east side of Seventh Street.

Construction of a new pumping facility near the Northeast corner of Channel and Seventh Streets.

TABLE I

BEST APPARENT PROJECT - SUMMARY DESCRIPTIONNorth Point Pump Station

33 mgd pump facilities  
6,000 square feet

18,000  
feet

Force Main: 36" diameter

North Point Plant to Sansome  
Street via Francisco,  
Montgomery and Chestnut

Open Cut

Construction

Force Main: 36" diameter

Sansome, Embarcadero to  
Market  
Across Market to Ecker  
Ecker to Stevenson  
Stevenson to Second  
Second, Stevenson to Mission  
Mission, Second to Fourth  
Fourth, Mission to Howard  
Howard, Fourth to Seventh

Construction requires  
several open cuts to  
insert force main inside  
North Point Main  
(12-20' long by 7' wide)

Force Main: 36" diameter

Seventh, Howard to Berry

Open cut

Construction

Force Main: 24" diameter

Berry, Fourth to Seventh

Open cut

Construction

Modifications: rechannel  
North Point Main flows to  
Channel Street Pump Station

Harrison Street at 10th, 14th  
15th, and 16th  
Howard Street at 5th and 6th  
Brannan Street at 5th, 6th  
and 7th

Open cuts  
at three intersections  
(20-60' long by two  
traffic lanes wide)



Channel Street Pump Station

240' x 275' lot near the North  
corner of 7th and Channel  
114 mgd pump facility

Force Main: 66" diameter

Channel to Owens Street

South on Owens to Sixteenth Street

Across block 3944  
(Southern Pacific prop.)  
to Mariposa and Indiana

South on Indiana to Army Street

From Army diagonal across  
block 4351 & 4349 to Islais Creek

Islais Creek west of the outfall  
structures and within Freeway  
right-of-way

Freeway to Rankin Street at Galvez  
Avenue east on Galvez to Quint  
Street

12,000  
feet

Open cut  
Construction



MAP  
OF THE  
CITY AND COUNTY OF  
**SAN FRANCISCO**  
DEPARTMENT OF PUBLIC WORKS

BUREAU OF ENGINEERING

ROBERT C. LEVY  
CITY ENGINEER

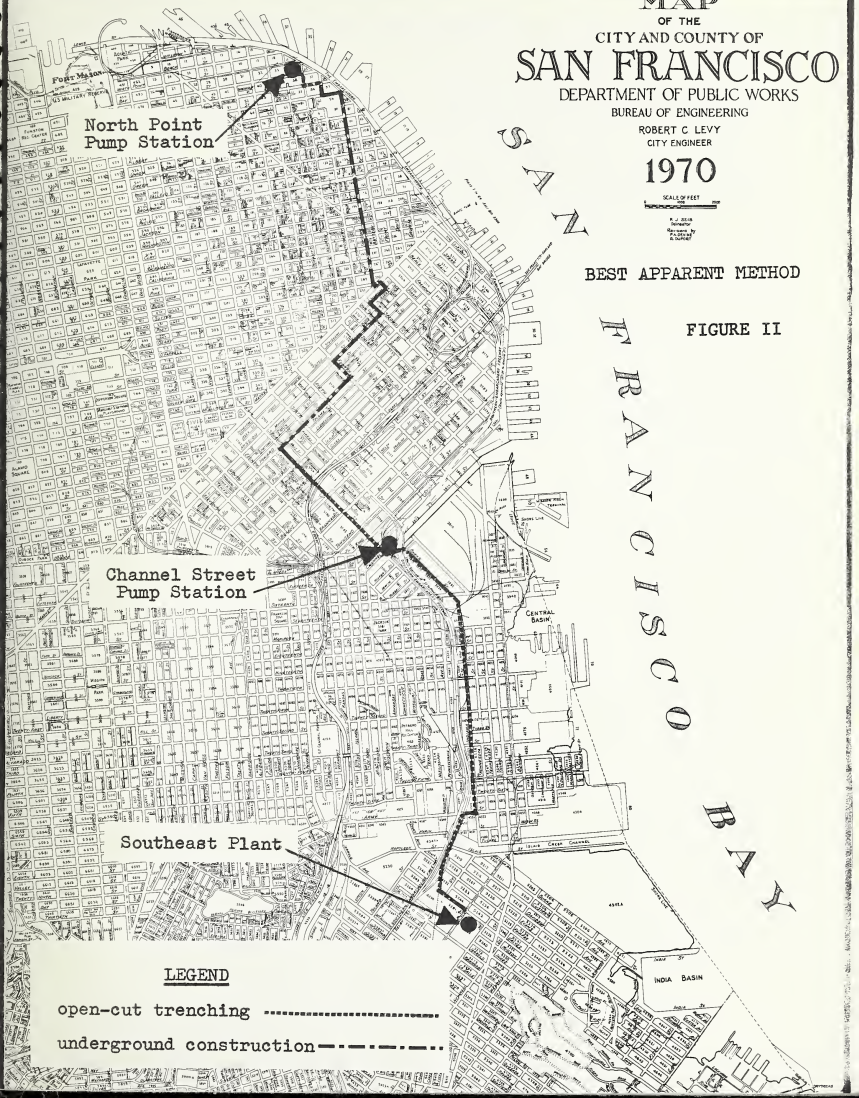
**1970**

SCALE OF FEET

1" = 200'  
As shown by  
A. H. HARRIS

**BEST APPARENT METHOD**

**FIGURE II**



**LEGEND**

open-cut trenching -----

underground construction - - - - -





Construction of 24-inch diameter force main from the existing Fourth Street Station to the proposed Channel Street Pumping Station. Construction method would be open-cut trenching.

Modifications to the existing North Point main will be made in order to divert flows to the Channel Street Pump Station. These modifications will take place at the intersections of 10th, 14th, 15th and 16th, on Harrison, and will require open cuts 20 to 60 feet long.

Other modifications of this nature may be necessitated at Fifth and Sixth on Howard, and at Fifth, Sixth, and Seventh on Brannan.

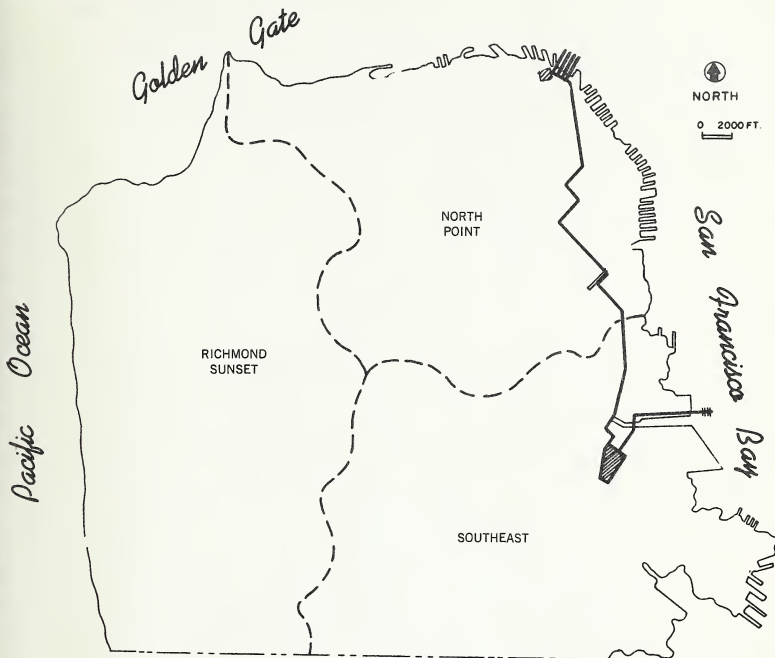
Environmental Impacts

Impacts common to all alternatives - completion of the North Point to Southeast Transporter will have the immediate beneficial effect of eliminating dry weather effluent discharge to the Northshore waters of the City. Cessation of this activity will eliminate the principal source of floatable material, discolored receiving waters, and obnoxious odor in the City's Northern Shore area. This will improve the recreation and fishing opportunities in the area, and contribute to the area's growth in value for increased commercial and residential uses.

During the construction phase of all alternatives, disruptions to pedestrian and vehicular traffic can be anticipated within the immediate construction area. Associated construction impacts, such as increased noise and air pollution, can also be anticipated.

Noise - the acoustical quality of the construction areas will be affected primarily by heavy equipment noises and movement of personnel and materials associated with construction activities. Despite the variety in type and size of construction equipment, similarities in the dominant noise sources and patterns of operation permit all equipment to be grouped into a very limited number of categories. These categories are indicated on Table II, together with their corresponding noise level data.

BEST APPARENT PROJECT  
MAP



The facilities and modifications, collectively known as the North Point Crosstown Transport System will be constructed under several simultaneous contracts. The pipeline contracts will average approximately \$2.8 million each, and will take 2 to 3 years to complete.

The North Point Pump Station will cost approximately \$4 million and the Channel Street Pump Station will cost approximately \$8 million. The entire cost of this project will be shared under the following formula:

- 75% Federal
- 12-1/2% State
- 12-1/2% San Francisco Water Pollution Bond Funds



			NOISE LEVEL (dBA) AT 50 FT						
			60	70	80	90	100	110	
EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES	EARTH MOVING	STATIONARY	COMPACTORS (ROLLERS)		H				
			FRONT LOADERS						
			BACKHOES						
			TRACTORS						
			SCRAPERS, GRADERS						
			PAVERS				H		
			TRUCKS						
	WATERALS HANDLING		CONCRETE MIXERS						
			CONCRETE PUMPS			H			
			CRANES (MOVABLE)						
			CRANES (DERRICK)				H		
	STATIONARY		PUMPS		H				
			GENERATORS						
			COMPRESSORS						
IMPACT EQUIPMENT	JACK HAMMERS AND ROCK DRILLS	PNEUMATIC WRENCHES							
		PILE DRIVERS (PEAKS)							
OTHER	VIBRATOR								
		SAWS							

Note: Based on Limited Available Data Samples

TYPICAL CONSTRUCTION EQUIPMENT NOISE RANGES.

TABLE II



Pile driving will be required during construction of the North Point to Southeast Transporter. Conventional pile drivers are either steam-powered or diesel-powered; in both types, the impact of the hammer dropping onto the pile is the dominant noise component. Noise is also generated by the power supply; steam-powered pile drivers generate noise by releasing steam at head and diesel-powered pile drivers generate noise by the combustion explosion that actuates the hammer. Noise levels are difficult to measure or standardize because they are affected by pile type and length; however, peak noise levels tend to be about 100 dB or higher at 50 feet. This noise level is about the same as a jet aircraft at 1000 feet.

Air quality will be affected locally by construction activities since air pollutants such as dust, smoke and exhaust fumes are generated by earth moving operations and engine exhausts. The control of dust will be especially important in sand dune areas during construction. The generation of dust in these areas coupled with the occurrence of normal breezes in the area, could have an adverse effect on residences within several hundred feet of the construction site.

As all alternatives propose pumping a portion of North Point sewage that now arrives for treatment through a gravity system, the project will require increased energy consumption. The energy source to be used in all alternatives is electrical.

#### IMPACTS OF THE BEST APPARENT METHOD

##### North Point Pump Station

A 33 mgd pump station will be constructed underground on Kearny

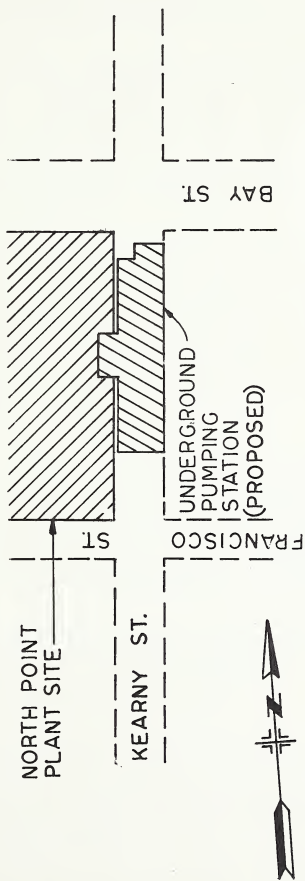
Street between Bay and Francisco Streets. Construction will involve approximately 6,000 square feet of surface open cut excavation. Local land uses are commercial and light industry; the North Point Treatment Plant is also immediately adjacent to the proposed pump station on the west side of Kearny Street. (See Figure III). Existing vehicular traffic and public transit facilities use this portion of Kearny Street between Bay and Francisco. Following construction, Kearny Street will be closed to vehicular traffic in conformity with the "Northern Waterfront Plan" element of the Comprehensive Plan for San Francisco, prepared by the Department of City Planning, which proposes that Kearny Street (from Chestnut Street to The Embarcadero) be closed to vehicle use and serve as a pedestrian promenade. Construction will be limited to City streets, (none of which are within San Francisco Port jurisdiction) and will involve minor utility relocations. Construction time will be approximately 24 months.

#### North Point Pump Station To Embarcadero Force Main

This segment of the Transporter System will result in the construction of 1500 feet, 36-inch diameter, force main from the North Point Plant to the intersection of Sansome Street and The Embarcadero.

The method of construction will be by open trench excavation of Francisco, Montgomery, and Chestnut Streets. Land uses facing the route of this segment are predominantly light industrial and commercial. Private vehicular traffic along the rather wide streets is normally very light, and the only public transit activity in the area is at the intersection of Sansome Street and The Embarcadero where





SCALE: 1"=100'

SITE LOCATION  
NORTH POINT PUMP STATION



the Third-Evans 42 Bus Line crosses approximately 170 times daily. The trench will be about seven feet wide, necessitating the closure of one traffic lane. Parking, which is currently permitted on both sides of the street, will be adversely affected during construction.

Minor utility disruptions are likely to occur along the 1500 foot route. Impacts associated with construction should last only six to nine weeks, and no operational impacts are anticipated.

#### Embarcadero To Seventh And Howard - 36-Inch Force Main

A 36-inch force main will be installed within the existing North Point sewer. This 11,800 foot project will be completed beneath: Sansome Street from The Embarcadero to Market; across Market on Ecker to Stevenson; along Stevenson to Second; across Second to Mission; along Mission to Fourth; Fourth to Howard and along Howard to Seventh.

The route for this construction passes through many of the most heavily used commercial areas of the City. Sansome Street passes through the center of the City's Financial District, and the major high rise office building area.

Land uses common to that portion of the construction route along Mission from Second to Fourth are Retail Sales, Downtown Support, and some Office Building activity.

The route passes through the Yerba Buena center project area along a portion of its Mission and Howard length and all of its Fourth Street portion.

Pedestrian and vehicular traffic along all of the route is heavy. Public transit utilizes Sansome, Mission, Fourth and Howard within the project area. Mission has been identified a Transit Preferential Street, while Howard Street is classified a Major Thoroughfare by the Transportation element of the Comprehensive Plan prepared by the Department of City Planning.

Tables III and IV display public transit activity along the streets coincident to construction and peak hour vehicle volumes associated with these streets.

The construction method to be employed in this segment will require several mid-block street openings which will be 12 to 20 feet long and 7 to 10 feet wide, each will be open 2 to 3 months.

Upon completion of this project which will take 2 to 3 years, the extant North Point sewer main capacity will be reduced by approximately 25% and is the only operational impact associated with the project. Figure 4 depicts a cross section of the North Point sewer with the force main installed.

#### Howard To Berry Street - 36-Inch Force Main On Seventh

This segment features construction by open-cut trenching, of approximately 4,000 feet of 36-inch force main from Howard to Berry along Seventh Street.

Land uses along Seventh Street within the project area are heavy commercial and light industrial.

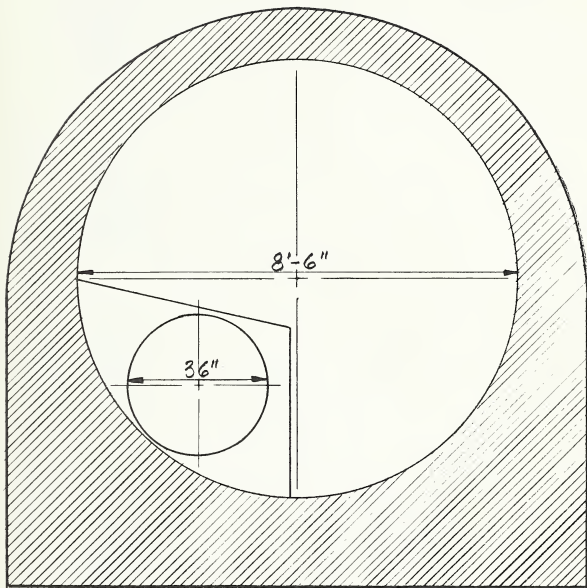


FIGURE 4

NORTH POINT SEWER MAIN  
SHOWING PROPOSED 36"  
FORCE MAIN

Not to scale



TABLE III

Transit Use Patterns - Downtown Street's  
On Force Main Route

	*Sansome Market to Embarcadero	Seventh Howard to Brannan	*Fourth Mission to Howard	*Second Stevenson to Mission	*Mission Second to Fourth
Golden Gate Transit Buses-Trips/ day	190				
Golden Gate Transit Buses-peak hours**	150				
Trips/day					
Muni bus route number	#42	#85 #14	#30	#84	#40
Muni bus trips/ day	170	30 170	120	35	0
Muni bus peak hours*					
Trips/day	70	0 70	60	0	120

\*\* Peak hours are 7-9 am and 4-6 pm

\* Streets where Force Main will be constructed within existing sewer and disruption to surface will be minimal.  
Trips are defined as one-way.





TABLE IV

Vehicle Use Patterns - Downtown Streets  
On Force Main Route

	*Sansome Market To Embarcadero	Seventh Howard To Brannan	*Fourth Mission To Howard	*Second Stevenson To Mission	*Mission Second To Fourth
Vehicles 7-8 am**	622	668	908	146	1231
Vehicles 8-9 am	733	845	1061	203	1 27
Vehicles 4-5 pm	531	1074	1388	239	1 51
Vehicles 5-6 pm	578	982	1261	196	1621
Vehicles 1-2 pm	625	899	1151	245	1511

\* Streets where Force Main will be constructed within existing sewer and disruption to surface will be minimal.

\*\* All measurements taken on average days. Tuesday-Thursday



Seventh Street is classified a Major Thoroughfare and a Transit Preferential street by the Transportation Element of the City's Comprehensive Plan. Figure IV indicates typical traffic usages along Seventh Street.

Construction by open-cut trenching will necessitate the prohibition of parking along the side of the street associated with construction and may require the closure of one lane of traffic.

The trench, which will be approximately seven feet wide and vary in depth from 7 to 13 feet, will require the use of jack hammers, backhoes, pavement breakers and other heavy construction equipment, which will add to the existing noise and air pollution levels in the area.

Conflicts with other sub-surface utilities can be anticipated. Some sewers and high pressure watermainns will probably have to be relocated. Construction of this segment will require 4 to 6 months and is expected to occasion no operational impacts.

#### Fourth Street Pump Station

The existing Fourth Street Pump Station, which presently pumps an average 6.5 mgd of the North Point drainage district's average 60 mgd flows to the North Point Water Pollution Control Plant, will be modified to pump these flows to the Southeast treatment plant via the Channel Pump Station. The Station will be modified in a manner as to retain its capability of pumping to the North Point Plant.

The existing station is located on a site immediately adjacent

to the railyard of the Southern Pacific Passenger Terminal. Directly across the street is the China Basin Office Building. Although the area is zoned M-2, which is heavy industry, predominate uses are those related to transportation and commerce.

Fourth Street is neither a Major Thoroughfare nor a Transit Preferential street.

Construction impacts are anticipated to include a slight increase in traffic occasioned by technicians performing the modification. No excavation will be required, and all construction impacts will be highly localized and confined to the pump station building itself.

The anticipated operational impact will be the added capability of the station to pump in either direction. No expansion of capacity will be accomplished by this project, therefore, no additional, energy requirements are anticipated.

#### Berry From Fourth To Channel Street - 24 Inch Force Main

A 24-inch diameter force main will be installed beneath the surface of Berry Street, from the existing Fourth Street Pumping Station to the site of the proposed Channel Street Pump Station.

Land use along the construction route is heavy industrial in nature. Railroad passenger and freight activities predominate in this area, owing to the close proximity of the Southern Pacific Railroad Terminal. Railroad tracks cross the street at grade in several places rendering its utility as a traffic thoroughfare limited.

This construction segment is to be accomplished by open-cut trenching, a method that will necessitate the closure of one lane of traffic on the 67-1/2 feet wide street.

The trench would be 6 feet wide and vary in depth from 7 to 13 feet along the 2,800 feet length of the project boundaries. Public transit activity along the construction route is confined to the crossing of Third and Berry by the #32 Embarcadero bus approximately 56 times daily.

Although private vehicular patterns in the area are historically light, there will be some degree of impact associated with construction activity.

Other impacts include the additional noise and air pollution associated with heavy construction equipment such as jack hammers, pavement breakers, and backhoes.

Minor utility conflicts can be anticipated with this segment as with all open trench construction and relocations of sewer and water lines may be required.

These impacts would be most apparent during excavation and construction. No operational impacts are expected.

#### Channel Street Pump Station

A large pump station will be constructed on a lot near the north corner of Channel and Seventh Streets. Construction of the 35-foot high, 150-foot x 212-foot structure, will require excavation

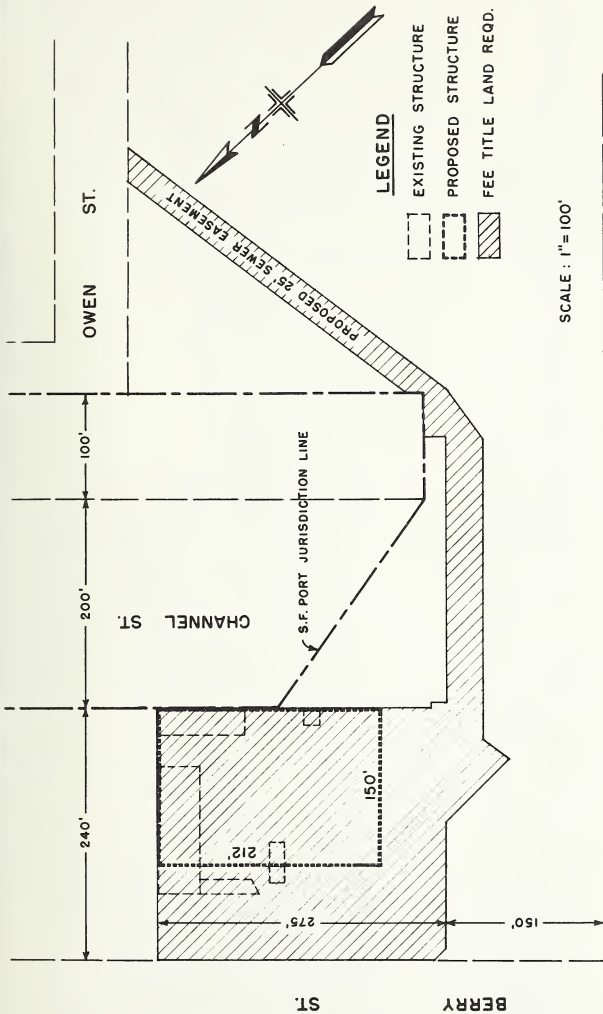
of several cubic yards of material to accommodate the facility sub-surface portion which is 34 feet deep.

The site, which is currently occupied by several small sheds, is in light industrial use, as are adjacent properties. Private vehicular use patterns are light (8500 trips in a typical 24-hour period) and the street is not used for public transit. Traffic and use patterns on Channel Street are similar. The construction of this project will not necessitate the blockage or closure of either street, and impacts upon the thoroughfares will be limited to the additional traffic occasioned by excavation and construction activities.

As with most surface construction activities, additional noise, dust, and particulate emissions from motorized construction equipment can be anticipated in the immediate vicinity.

The construction of this facility, which is expected to require 2 to 3 years for completion, will result in the installation of six, 800 horsepower pumps. This equipment will pump nearly all of the North Point drainage district's dry weather flows currently 60 MGD.

Energy requirements for this operation are expected to be 6.9 million kilowatts per year. The energy requirement is the major operational impact anticipated. A minor impact may be a high pitched whine associated with high speed electrical motors. This impact is highly localized however and most likely of no effect except those working within the structure itself.



PROPOSED SITE LOCATION  
CHANNEL ST. PUMP STATION  
**FIG. 5**





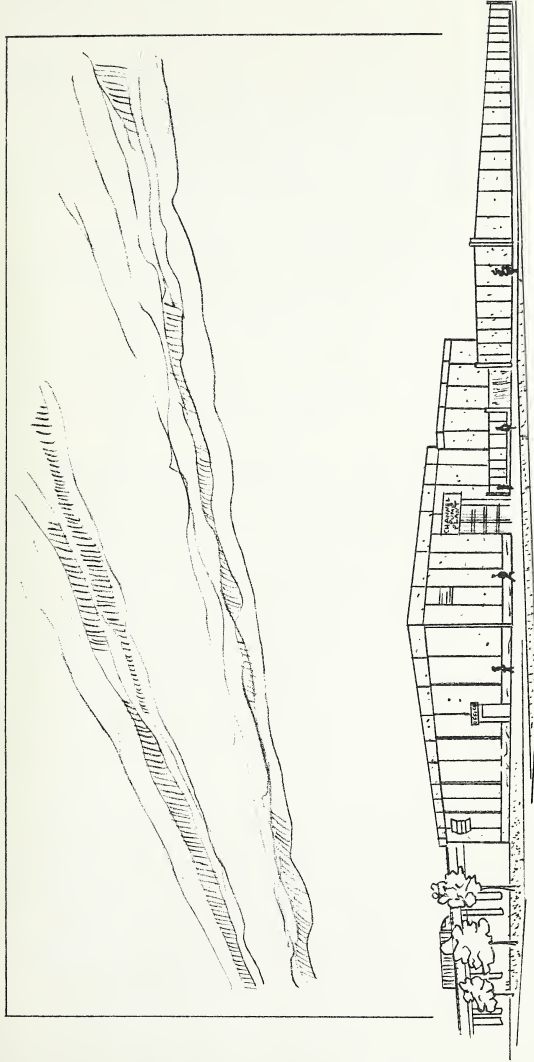


FIGURE 6

DATE FEBRUARY 8, 1974

PERSPECTIVE  
CHANNEL PUMP STATION  
BERRY STREET AND 7TH STREET, SAN FRANCISCO

CITY AND COUNTY OF SAN FRANCISCO  
DEPARTMENT OF PUBLIC WORKS  
BUREAU OF ENGINEERING



## Sewer Diversions

Several modifications to existing sewer works will be required to divert North Point drainage flows away from the North Point Plant and toward the Channel Street pump station.

These modifications involve open cuts of 20 to 60 feet at the following intersections:

- 10th and Harrison
- 14th and Harrison
- 15th and Harrison
- 16th and Harrison

The 20-foot wide trench will affect two lanes of traffic (one in each direction) during the construction period, which is anticipated to be 2 to 3 weeks at each site.

Additionally, less extensive work of a similar nature will be accomplished at the intersections of:

- 5th and Howard
- 6th and Howard
- 5th and Brannan
- 7th and Brannan

In all cases, impacts are anticipated to occur during the construction period only. A summary of the existing characteristics of these sites and the anticipated construction impacts follow:

Land uses along Harrison Street from 10th to 16th streets are generally light industrial. Traffic along the street is light to

moderate with one exception, the intersection of 10th and Harrison. In addition to this intersection receiving the highest private vehicular use, (approximately 14,000 vehicles in a typical 24-hour period), the #19 (Polk Street) Muni bus is scheduled to cross the one way intersection 84 times per day.

Land use along Howard Street between 5th and 6th is heavily commercial and private vehicular traffic is heavy. Additionally, 190 Golden Gate Transit buses cross both intersections during a typical day. While construction at these sites is anticipated to be of short duration and less extensive, traffic disruptions will occur at these sites along this major thoroughfare.

Land use along Brannan at 5th and 7th Streets is heavily commercial; although identified as a "Major Thoroughfare" by the Transportation Element of the City's Comprehensive Plan, traffic is relatively light. Muni Railway's #19 Polk and #27 Noe bus lines cross the two intersections under discussion approximately 80 times per day.

Work Common To The Best Apparent Method And All Alternative Routes.

The Transporter route from Channel Street southerly to the Southeast Plant is common to the "Best Apparent" route and all alternatives. This route has been determined as the only practicable route through the southerly sector because:

- (a) it requires less trench depth to avoid existing subsurface installations.
- (b) it involves the crossing of both Islais Creek and Channel

Street Waterway at the headend of these water inlets, as opposed to inverted siphon crossings which are more costly to construct and erratic in operational behavior.

- (c) it requires the least disruption of traffic and business activity.

This route, the existing Environmental setting along it, and the anticipated Environmental Impacts associated with its completion follow:

This segment of the project is the construction of a 66-inch force main from the Channel Street Pump Station to the Southeast Plant.

The route for this 12,500 segment is: across the Channel Street waterway between 6th and 7th Streets, southeasterly on Owens to 16th Street, across Assessors' block 3944 to the intersection of Mariposa and Indiana, southerly along Indiana to Army Street. From Army Street it goes diagonally across Assessors' blocks 4351 and 4349 to the "head-end" of Islais Creek and across Islais Creek to the intersection of Rankin and Galvez. Then it goes easterly along Galvez to its termination at the Southeast Plant on Quint Street.

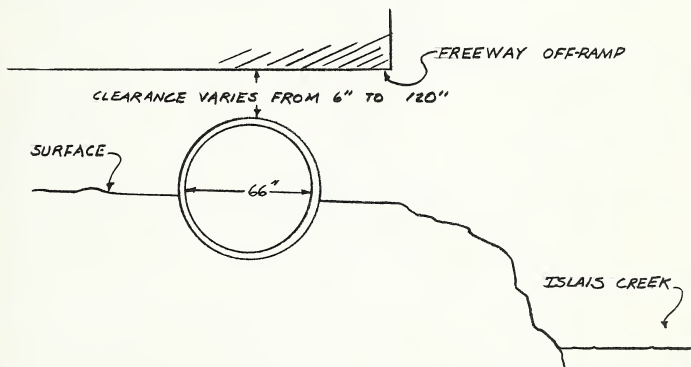
Existing land uses along this route are principally light and heavy industrial and use by private vehicles is light. No public transit routes are involved. Construction will consist of open-cut trenching and result in the 66-inch force main being buried along its entire length except the Islais Creek and Channel Street waterway crossings. These crossings will be made above the surface to avoid

the existing outfalls at the head ends of Islais Creek (see Figure 7) and the Channel Street Waterway (see Figure 8 and 9).

Sub-surface portions of this segment will require a trench 9 to 10 feet wide, which will vary in depth from 14 to 19 feet.

Construction time is anticipated to be 2 to 3 years, and during that period the impacts normally associated with open trench construction can be anticipated. Briefly summarized, they are increased noise, and particulate emissions from the construction equipment, vehicular and pedestrian traffic interference, and temporary disruption of utility services to effect relocations.

CROSS SECTION OF FORCE  
MAIN AT HEADEND OF ISLAIS CREEK



NOT TO SCALE

FIGURE 7.





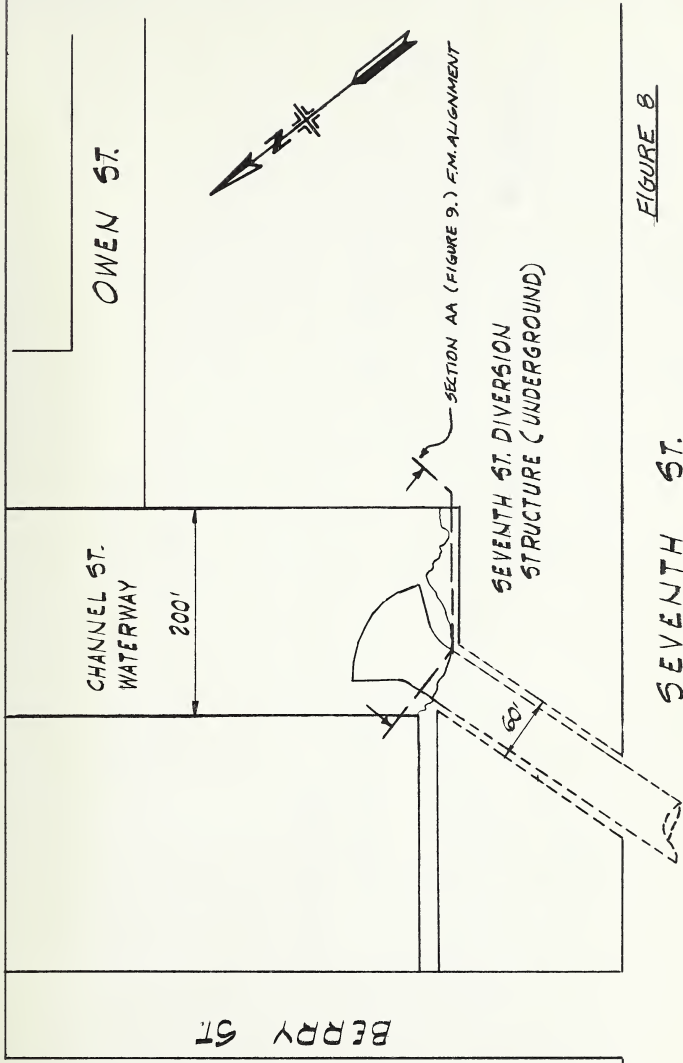


FIGURE 8

EXISTING SEWER  
OUTFALL AT HEAD  
END OF CHANNEL ST.

SEVENTH ST.

Scale 1" = 100'



SECTION AA OF FIGURE 8  
HEADEND OF CHANNEL

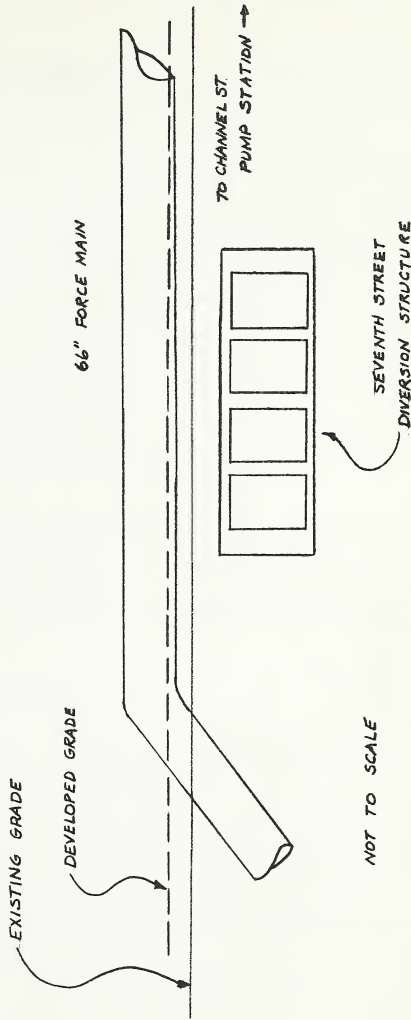


FIGURE 9.



## CHAPTER VI

### Alternatives

This Chapter discusses some of the alternative schemes to the best apparent method which were considered and discarded. While the null or do-nothing alternative is included for comparison purposes, the reader is reminded that the North Point Transporter System is a portion of the San Francisco Wastewater Management Master Plan, and discussion regarding alternative methods of achieving the goals of the Master Plan are to be found in the Environmental Impact Report on the Master Plan.

This Chapter then will discuss only the alternative feasible routes for the Transporter System, the environmental setting along these routes, and the anticipated impacts should these alternatives be adopted.

### Null Alternative - No Project

An adoption of the null alternative would preclude all construction and operational impacts associated with the best apparent method and/or alternative routes. However, in the absence of an alternative project to eliminate or improve the discharge of North Point dry weather effluent, and storm overflows to the waters of the Northern shore of the City, a currently adverse impact would continue.

Many schemes and routes were considered to fulfill the goals of the Wastewater Management Master Plan. Alternative tunnel alignments were considered beneath private property rather than directly under the City streets. However, this approach was quickly excluded because the City would be subject to damage suits, due to any resulting settlement, particularly on the high-rise buildings in the downtown area. It was also concluded that the right-of-way problems would have been substantially increased.

In the "North of Market Area", alignments west of Van Ness Avenue were rejected on the basis that the added distance afforded little accompanying benefit. Market Street BART stations effectively preclude crossing Market Street at Second, Fourth, Fifth, Seventh or Eight Streets, a fact which circumscribes the range of feasible alternative selections.

In the area south of Berry Street, an alignment was considered along Third Street which required deep underwater crossing of the Channel Street waterway and Islais Creek. This route was eliminated because of excessive costs and significant traffic routing problems on Third Street, a heavily used traffic artery.

Another southerly route, consisting of a tunnel passing diagonally under the Potrero Hill area, was considered. This alternative would commence at Ninth and Brannan and follow the old Western Pacific right-of-way. The tunnel portion (approximately 1900 feet) would follow the old tunnel alignment (which suffered a fire and subsequent cave-ins) and extend from 19th to 22nd

Streets. Then, north of 23rd at Pennsylvania, the force main would cross the Southern Pacific Railroad tracks between Pennsylvania and Iowa Streets and under the freeway to Iowa Street, then proceed southerly on Iowa. This alignment was considered impractical because:

- A tunnel through the previous Western Pacific tunnel cave-in might induce additional settlement and subsequent liabilities
- The force mains would have to cross above the Southern Pacific main line tracks
- The route is longer

The route crosses large diameter sewers on piles which require underpinning and additional construction depth. Also, low points in the force main will decrease operational reliability characteristics caused by heavy particulates settling out, an inherent aspect of pumping raw sewage.

These and additional route/schemes were considered and discarded. For a detailed discussion of the criteria utilized to select the best apparent route, see Chapter III.

In addition to the Best Apparent Method, four alternative routes were identified as being practical. They are, for purposes of identification called "The Embarcadero", "The Tunnel", "The Inland", and "The Remote Pump Station". The discussion in this chapter will limit itself to these alternative routes, the extant

environmental setting adjacent to these routes, and impacts which can be anticipated, should these routes be adopted.

### "The Embarcadero"

The Embarcadero Route/Scheme which is displayed in Plate 2, (with the other alternative route/schemes) proposes an enlarged pumping facility located beneath Kearny Street, between Bay and Francisco Streets. This proposed station is identical in size and scope to the station facility outlined in the Best Apparent Project. Construction impacts of the two projects would be identical, therefore, they will not be repeated here. The pipeline portion of the Embarcadero scheme would necessitate a 1000 foot open-cut construction in Francisco Street from Kearny Street to the Embarcadero. The route would then proceed along the Embarcadero around the periphery of the City to Berry Street, south-westerly along Berry Street to 6th Street, and south along 6th Street to Channel Street, where the route would join the southern portion of the project which has been designated as the only feasible route and previously discussed in detail.

As previously discussed in the Best Apparent Method's impact analysis, uses along the Embarcadero segment of the route/scheme are commercial and industrial. Activities include warehousing, cargo handling, and professional commercial activities, such as architecture, advertising and consulting services. Additionally, the route passes through the Sausalito and Tiburon Ferry Facilities, and important downtown transit hub. Land uses adjacent to the Berry Street



segment of this alternative route/scheme are commercial and light to medium industrial.

All construction envisioned under this alternative scheme is confined to existing City streets, and would be of open-cut trench type.

Private vehicular traffic on the Embarcadero segment of this alternative route is heavy, public transit along the Islais route is provided by Muni Railway's No. 32 Embarcadero bus line.

Open-cut trench construction, as previously discussed in detail which is necessitated for adoption of this alternative, would occasion traffic disruption and inconveniences to those utilizing their own vehicles as well as those employing transit along this route. The private vehicular use along the Berry Street portion of this alternative is light and currently use of the street for public transit is limited to the intersection of Fourth and Berry Streets where the No. 32 Embarcadero bus crosses approximately 77 times daily. Construction along this segment will have adverse impacts upon private vehicular traffic in the area.

The open-cut method of construction will result in a trench 10' wide and from 14 to 19 feet deep, and will necessitate the use of heavy construction equipment such as pavement breakers, back hoes, and jack hammers along its 16,000 foot lengths.

This equipment, when operating, will add to existing noise levels in the area and to the existing sources of particulate

emissions throughout the construction zone.

### Aesthetics Restoration

The majority of construction activity associated with this project is confined to presently paved City streets, however, some construction will occur in locations where the disturbance or removal of native vegetation will be required. In all instances wherein this is the case, contractors will be required to restore the location as nearly as possible to its original condition, or to provide suitable replacement landscaping.

### Visual

At two points along the project route, the force main will surface and run parallel to the ground for 500 feet at a bottom elevation of approximately two feet. This technique is required to span the Channel Street waterway and Islais Creek, and is discussed in the Environmental Impacts of the Best Apparent Method section of this document.

Efforts have been made to locate these force mains in areas least visually accessible to the general public. This concern has resulted in locations directly beneath existing freeway structures which effectively shield the exposed portion of the main.

### The Tunnel Route

The Tunnel Route/Scheme also proposes construction of an

underground pumping facility beneath Kearny Street between Bay and Francisco Streets. The proposed facility is identical to that described in the Best Apparent Method, to which the reader is referred for details regarding anticipated impacts.

The pipeline portion of this scheme commences with an open trench, 10-feet wide, and 14-feet deep, along Kearny Street, to a tunnel portal, to be excavated in Kearny Street, between Francisco and Chestnut Streets.

From the portal, the route continues as a tunnel under Kearny Street to Market, beneath Market to Third Street, and under Third to a point just north of Third and Folsom Street, where it surfaces into an open trench 17-feet wide and 16-feet deep. The route/scheme then proposes open-cut construction along Third to Berry Street, and then west on Berry to a point just opposite Owen Street.

The remainder of this route, including the pier supported waterway crossing at Channel Street, has been described in detail previously.

Land uses along the open-cut trench segment from the North Point Plant to The Tunnel portal are commercial, and although the street is identified as a public thoroughfare, little pedestrian or vehicular traffic make use of it.

The Tunnel which commences at the foot of Telegraph Hill would pass beneath the road bed of Kearny Street, (sometimes at depths of 120 feet) and would be excavated primarily by boring

equipment.

Land uses along this segment are principally office building orientated with some light retailing and a few residences, which should not be disturbed or impeded by this activity. However, blasting might be necessary, in which case residents and office building workers might experience slight shocks or vibrations.

The tunnel resurfaces into an open trench on Third Street, north of Folsom. The trench would be 10-feet wide and vary in depth from 14 to 19 feet.

Land use along this segment is commercial and industrial. Private vehicular traffic is heavy. Additionally, the No. 15 - Third and No. 42 - Third-Evans utilize this transit corridor and adverse impacts to pedestrian and vehicular traffic during this segment of the proposed project can be anticipated. Utility conflicts are expected to be minimal.

At Third and Berry this alternative would follow the alignment along Berry, to the Channel Street crossing described in the Embarcadero scheme, and to the southern portion described in 'Work Common to all Alternatives'.

### The Inland Route

The Inland Route proposes a larger pumping station at the North Point site (beneath Kearny between Bay and Francisco Streets). Although this facility is larger by 1000-square feet, its construction impacts are sufficiently similar to those previously discussed

to negate the need to repeat them here.

This alternative proposes an alignment commencing at the North Point Plant, north along Kearny to North Point Street, to Polk Street. At Polk, the Route would turn south and continue along Polk to Sutter, west on Sutter to Larkin, south on Larkin to Market. The Route would then cross Market at Ninth and continue along Tenth Street to Brannan Street, north-east along Brannan Street to Eighth, south along Eighth to King Street, then along King Street to Seventh Street. The Route would then follow Seventh Street to Berry Street and Berry Street to the Channel Street waterway where it would join the southern segment common to all alternatives.

The construction method along the entire 34,400 foot route would be by open-cut trenching except a short tunnel which would be required to pass beneath the cable car tracks at Polk and Hyde Streets.

This alignment passing, as it does through the heart of the City, has almost every imaginable land use adjacent to it. The North Point segment is heavily residential with portions that reflect the heaviest density patterns in the City. The Polk Street segment is an extremely busy retail and community services strip along the project's entire length. Sutter and Larkin Streets are residential, Ninth Street is commercial, and Brannan Street is industrial.

Vehicular traffic is heavy along all portions except from Brannan Street to the Channel Street waterway. Additionally, traffic along Polk Street is extremely congested. Open trench construction in this area will probably necessitate elimination of parking along this thoroughfare. Polk Street is also a major public transit thoroughfare.

Traffic along the Ninth Street-Larkin Street segment of this alignment is one-way and heavy. This segment is heavily influenced by the James Lick Freeway off ramp. Heavy use of these streets is made by public transit.

In summary, the adverse traffic impacts associated with this manner of construction would be particularly severe throughout this alignment. Additionally, because of the residential nature of land uses adjacent to major portions of the route, the impacts of noise and air pollution will be felt most intensely by area residents.

#### The Remote Pump Station

This alternative proposes the diversion of approximately 60% of the North Point drainage district's flows to a remote pump station which would be located at Fifth and Channel Streets.

The remaining flows would continue to arrive at the North Point Treatment Facility from which they would be pumped by a satellite pump station to the Fifth and Berry pump site and then on to the Southeast Plant.

This scheme is very similar to the "Best Apparent Method", and portions of the routing are identical.

An underground pump station identical to those previously discussed is suggested for the sub-surface of Kearny Street between Bay and Francisco Streets. A sub-alternative would be the modification of the existing pump station to fulfill the satellite pump station requirements of this scheme.

The pipeline route of this alternative would commence from the North Point Plant along Francisco Street to The Embarcadero by open-cut trench. At The Embarcadero, construction would commence within the North Point main in the manner and along the route of the 'Best Apparent Method'. However, the route would surface at Fifth and Howard Streets rather than Seventh and Howard and would continue along Fifth Street to a proposed new pump station on Fifth and Berry. The route would then continue along Berry Street to just east of 7th Street where it would cross and join the southern section common to all alternatives.

The proposed route from the Fifth Street Pump Station to the Channel Street crossing, and the manner of construction suggested is identical to that outlined for The Embarcadero scheme.

The segment of the remote Pump Station scheme not previously discussed in this report is an 8 foot gravity main along Fifth Street from Howard Street to the pump station at Berry Street.

Land uses adjacent to Fifth Street from Howard to Berry Streets are predominantly commercial and traffic volume is heavy. Two freeway ramps are located in the middle of this proposed alignment. The first, an on ramp at Fifth and Bryant, the second an off ramp at Fifth and Harrison.

The open trench type of construction suggested for this segment will have an adverse impact upon the vehicular traffic utilizing this thoroughfare during construction.

Table V is a summary of the alternatives discussed in this Chapter and Plate II depicts the routes proposed by each.







## CHAPTER VII

### Mitigation Measures

Adverse impacts associated with this project are the results of construction and operation of the completed project.

### Construction

While the construction impacts are for the most part temporary, they can be the most intense and widely felt. Mitigation measures that will be taken to minimize the adverse impacts of trenching and street openings are discussed below.

### Traffic

With the exception of three parcels of private property, construction elements of this program are limited to the City's streets, or other public rights-of-way. Therefore, construction impacts are likely to adversely affect pedestrian and vehicular traffic along open-cut trenches, and at the site of street openings. These adverse effects will be minimized by:

- Confining open cut trenches to one block length maximums
- Maintaining a minimum of two vehicular traffic lanes at all sites with the exception of Indiana between 24th and 25th Streets, where presently only one lane exists and will be maintained during construction

- Providing pedestrian and vehicular bridges to safely move cross traffic as required
- Maintaining close liaison with the City's traffic engineers, Muni Railway representatives, and the Police Department's Traffic Division, and other affected City Agencies to assure that traffic around and through the construction site is as smooth as possible
- Encouraging contractors to operate haul vehicles associated with the project during off peak traffic hours
- Insuring that contractors use routes to and from the construction site which have been designated as suitable in width and capacity for the haul vehicles involved

#### Noise

An additional adverse impact associated with this type of construction is noise. Heavy construction equipment is capable of generating a high level of noise in areas adjacent to the site and at appreciable distances from the site.

San Francisco's recently enacted noise ordinance prescribes maximum permissible noise emissions from powered construction equipment.

This ordinance restricts construction operations to normal daylight hours except under special permit or emergency, and requires equipment such as pavement breakers, and jackhammers to be equipped with intake exhaust mufflers and acoustically attenuating shields.

All requirements of the ordinance will be complied with. Additionally, contractors will be encouraged to:

- Use non-impact tools wherever possible
- Use sonic pile drivers where practical
- Erect sound barriers at construction sites

#### Air

Construction of this type generates additional localized airborne particulate loadings in the form of dust and motorized equipment emissions. Contractors will be required to minimize these adverse impacts by:

- Watering down bare dry soils
- Providing properly fitted covers for haul vehicles

Particulate emissions from internal combustion engines in the area will be kept at a minimum by strongly encouraging contractors to:

- Minimize trips to and from the site
- Shut down motorized equipment not actually in use

#### Utilities

Conflicts with other Utilities utilizing sub-surface routes can be anticipated. These conflicts will often necessitate the relocation of pipes, wires, or cables which will occasion interruptions of service. Prior to construction, contractors will be

required to contact all utilities likely to be affected by construction, and plan construction activities at a time least disruptive to users of the utility.

#### Site Excavations

The impacts of extensive excavation projects, such as the North Point Pump Station and the Channel Street Pump Station, are similar to those of open-cut trenching, and the mitigation measures to be taken are identical. The adverse impacts of noise, air pollution, and utility disruption are highly localized to these sites and traffic disruption is expected to be slight.

#### Aesthetics

All open-cut areas will be restored to original surface condition and all surface structures will be visually compatible with the surrounding areas.

#### Construction Within Existing Main

Construction of the force main within the existing North Point main will require a series of street openings. The principal effects of these openings have been discussed previously under traffic impacts.

In a sense, this construction method is a mitigation measure in itself, especially when compared with the open trench alternative. This method will greatly reduce adverse pedestrian and vehicular impacts. Emissions from excavating equipment will not occur, and

utility conflicts are virtually non-existent when using this method.

#### Measures Taken To Reduce Operational Impacts

The chief adverse operational impact associated with this project is the increased discharge of primary effluent from the Southeast Water Pollution Control Plant.

A companion project will upgrade the plant to secondary treatment levels shortly after completion of this project, thereby reducing its long range impact.

Increased energy requirements are an adverse impact of this project. However, route selection and system design which made maximum use of topography and gravity reduced these requirements to a minimum.

## CHAPTER VIII

### Seismic & Geologic

The geology of the San Francisco Peninsula consists basically of a dense Franciscan shale sandstone and chert bedrock. Along San Francisco Bay, numerous man-made fills have been placed over soft clayey Bay mud which in turn overlies old drowned Franciscan bedrock valleys in the downtown and Islais Creek areas.

### Faults

Basically, one active earthquake fault and three inactive faults trend northwesterly through the San Francisco area. The active fault is the San Andreas fault which lies in the ocean about 2 miles west of Lake Merced; no part of the San Andreas fault lies in the land area of the City of San Francisco. The last significant movement of the portion of this fault nearest to the City was in 1906 when the west, or ocean side, moved north as much as 21 feet with respect to the city side.

Of the three presently known inactive faults, the San Bruno fault lies in the Franciscan bedrock from 300 to 1500 feet under Lake Merced. There is no evidence that this concealed fault cuts up into the surface sand formations of the Lake Merced area, hence, it is considered to be inactive. The City College fault passes northwesterly through San Francisco City College and out near Seal Rocks. This fault is exposed at ground surface in



Franciscan rocks near the campus, but is concealed beneath the quarternary dune sands north of the campus; it is considered inactive. The shear zone which passes from Hunters Point up through Fort Point is an ancient fault which is found only in limited outcrops of the Franciscan; its location is characterized by ancient serpentine extrusions along the fault zone which have formed Hunters Point, Potrero Hill and part of Fort Point. There is no direct evidence that this fault, or shear zone, has been active in the past 100 million years; however, some surface soil failure may have occurred in the vicinity of this fault in 1906.

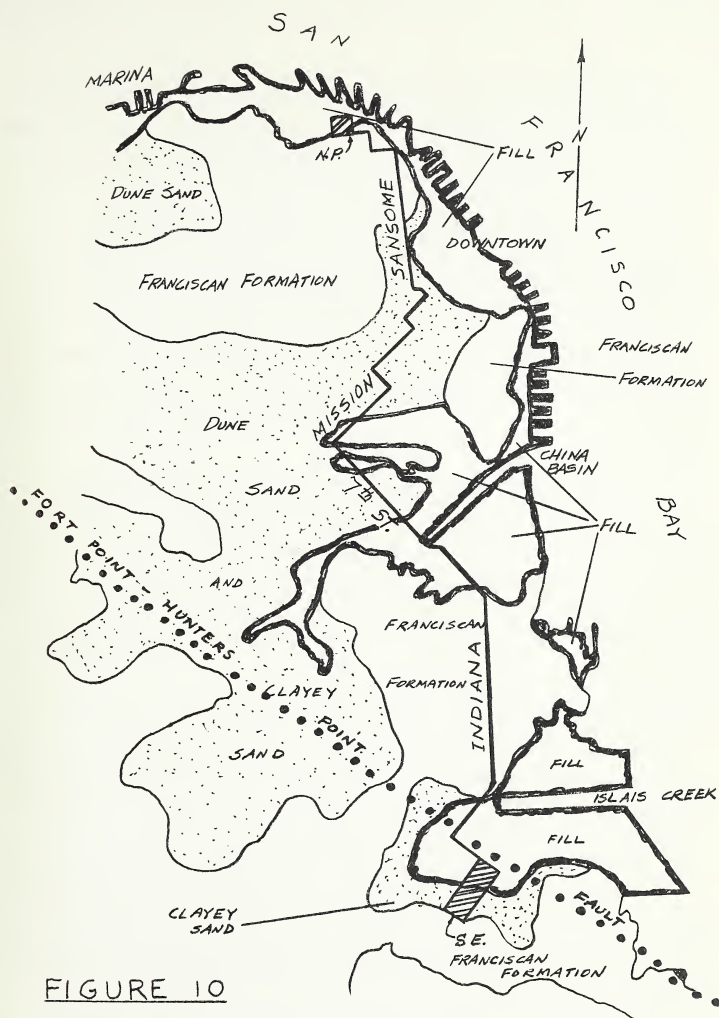
The transporter will cross the latter inactive fault. The Transporter will consist of 36-inch and 66-inch diameter pipe laid in a variety of conditions. Numerous soil and rock types will occur along the Transporter route, as Figure XII shows. The line will consist of a 36-inch diameter force main within an existing sewer from the North Point Plant, past the Downtown fill and to a pump station at the China Basin. From China Basin south, past the Potrero Hill bedrock and the Islais Creek fill, to the Southeast plant a 66-inch diameter force main will be provided.

### Seismicity

The activity of the San Andreas fault is well documented in the literature. At least five significant earthquakes have affected the San Francisco City area by movements on this fault in the last 135 years. In each case major land failures occurred.

In June 1838, a large (magnitude similar to 1906 event) shock originated on the San Andreas fault south of San Francisco. The Presidio and Mission Dolores were seriously damaged. In November 1852, a large shock (Intensity VIII on the Modified Mercalli Scale) caused considerable ground fissuring in the north end of Lake Merced, where it formerly was connected to the ocean; as a result, a channel some 300 yards wide and  $\frac{1}{2}$  mile long was washed out by the lake waters as they emptied to the ocean. The site of the 1852 washout was most likely through the east and north side of Fleishacker Zoo and along Sloat Boulevard to the ocean.

In October 1865, a large shock (Intensity IX) was centered along the San Andreas fault just south of the city and caused extensive lateral spreading and fissuring of filled land on Howard Street from 7th to 9th Streets. In April 1906, major San Francisco earthquake (magnitude 8.2) occurred, causing a continuous surface rupture on the San Andreas fault from southern Humboldt County to San Juan Bautista. The maximum horizontal movement was 21 feet at Tomales Bay, the probable epicenter; vertical fault movement was less than 3 feet. Damage was reported in all parts of the city, but it was generally least on the Franciscan bedrock areas where rock is close to the surface. Where the earth cover increased, damage generally increased, especially in the artificial fill-over-mud areas, Lateral-spreading land failures occurred in the filled Downtown and China Basin areas, producing lateral movements of 1 to 6 feet toward the Bay. Pavements were fissured, buckled and arched, and sewers and water mains broken. Well-ballasted street



**FIGURE 10**  
**GEOLOGIC MAP AND PROPOSED**  
**NORTH POINT TRANSPORTER FOR**  
**SAN FRANCISCO COUNTY**



car tracks were thrown into permanent shallow wave forms 1 to 2 feet high and several blocks of filled land surface were deformed into shallow waves of irregular length and amplitude.

In the dense sand areas, the effects were generally less destructive than in the fill-over-mud areas, although sand boils, fissures and sand bars were reported in the vicinity of Lake Merced. A timber railroad trestle, which crossed the narrow neck between the north and south arms of Lake Merced, was totally destroyed, when both the west and east banks of the lake liquefied and slid into the lake, uprooting the trestle.

In March 1957, the San Andreas fault produced a moderate (Magnitude 5.5) earthquake centered in the Mussel Rock area. While this was a milder event than the prior four described (no surface rupture was found along any fault) above, it nevertheless produced extensive landslides and liquefaction in the Lake Merced-Stonestown area.

Damage to the pile-supported sewage treatment plant at Linda Mar was negligible; however, ground settlement around the tanks caused buried pipelines to break. The Daly City sewage plant digester at Alemany and Lake Merced Boulevards rests on concrete spread footings 10 feet below grade. The location experienced backfill settlement of  $\frac{1}{2}$  to  $1\frac{1}{2}$  inches but the deeper tank base remained stable; no sewer line damage occurred. In general, sewage collection pipes from houses did not show damage.

At the Lake Merced pump station, a filled area settled 4 to 6 inches, severing a 12-inch pipeline where it entered the station. Four steel fresh water mains were broken in the southwest area of the city, as earthquake-induced water surges in pressure pipelines damaged air valves and weak joints. Line surges caused extensive pressure pipe damage in both the 1971 San Fernando and the 1952 Kern County earthquakes.

In the 1971 San Fernando earthquake, extensive damage reports were filed on water and sewage facilities. The general conclusions from these reports are:

- 1) active fault crossings are certain to sustain damage;
- 2) transitions between aboveground pipes and underground tunnels or tanks are potential breakage points;
- 3) pipelines on steep hillsides often suffer landslide damage;
- 4) buried pipes are damaged by soil compaction, lateral land spreading, soil liquefaction and severe ground shaking;
- 5) buried bell-and-spigot pipe joints are damaged when they are pushed together, pulled apart or deflected excessively by ground movement;
- 6) dynamic lateral soil pressures on buried tank structures often greatly exceed static design loads.

It is likely that strong earthquakes will cause pipe damage in the filled areas along the east side of San Francisco. The

pipelines which would be placed in fills will be relatively flexible elements (on a large scale), which essentially move with the soil; if the soil does not rupture, liquefy or shear, then pipe damage should not be great. It is expected that pipes in fills subject to lateral spreading could be pulled gradually easterly, with a maximum of as much as 6 feet, in a strong event, and that the vertical pipe alignment will be thrown into a series of waves of variable length and amplitude.

Where pipes transit from filled areas to stronger native soils or from soil to rock, differential deflections may occur causing damage. Likewise, ground fissures or local liquefaction will shear pipe or remove bedding support causing pipe damage. Ground motion in filled land and at cut-fill transitions can push or pull axially on pipe joints, causing joint breakage and pipe separations.

Generally, the City must expect heavy pipe maintenance in man-made filled areas after a strong earthquake. Maintenance can, however, be minimized by initially selecting a thick-walled, flexible-joint pipe with strong and long gasketed sliding joints at the connections. It would be desirable to work with pipe manufacturers to develop reinforced concrete pipe for the SPWWMP which could withstand large passive soil pressures and permit joint deflection and join sliding without serious joint leakage. The pipes should be installed on well-compacted granular bedding courses with at least 3 feet of well-compacted granular fill

at the spring line. Good backfill compaction will at least minimize the possibility of fill liquefaction around the pipe in low, wet areas.

In conclusion, pipelines in filled areas, especially fills over soft muds, will move with the soil, and earthquake damage will occur which will require extensive repairs. However, damage can be moderated by using strong, flexible, well backfilled pipe laid in as few fill-over-mud areas as is practicable.

#### Design Considerations

In the event of a seismic disturbance sufficiently severe to sever the Transporter, it is highly probable that quantities of untreated sewage would be discharged to the Bay through the existing outfalls until repairs could be effected.

Some contamination of the ground water table can be anticipated, however, the reader is reminded that the City does not derive its potable water supply from the ground water table.



## CHAPTER IX

### STATUTORY SECTION

#### Local Short-Term Uses vs Long Term Productivity

Implementation of the San Francisco Wastewater Management Master Plan is a long-term solution to the problem of adequate wastewater management for the City of San Francisco, and the North Point Transporter is one construction element of that plan. There will be a construction period of three to four years required for completion of this project. In this context, the short-term use becomes a dedication of the environment to construction that will ultimately achieve the long range goals of the Master Plan.

The temporary discharge of combined North Point-Southeast drainage district flows treated at a primary level will have an impact. However, this temporary short-term use of the environment is not expected to impair long-term productivity of the Bay.

#### Irreversible Environmental Changes

The lost resources associated with any major public works project are the raw materials and energy, in terms of labor and natural energy resources, that are applied to the project.

The proposed force main, pump stations and headworks which compose the North Point Transporter System are long-term permanent structures. The system is designed for drainage area capacity and

consequently a long useful life.

The construction of the Channel Street Pump Station will effect a change of land use, that is long-term or permanent in commitment.

Certain sewer reroutings will be accomplished by this project which will alter the current wastewater drainage patterns of the North Point Drainage District. These alterations are considered relatively permanent.

#### Growth Inducing Impacts

There will be no significant growth inducing effect resulting from implementation of this project. In the opinion of the Department of Public Works, the City is fully developed and any growth that might occur would be attributable to increasing densities, due to various forms of urban renewal.

The Sewage Transport System is sized in accordance with anticipated storm flows, and as such, is presently capable of handling increased domestic flows, however, this project in no way expands the domestic capacity of the System.

#### Cost Effectiveness

Cost-effectiveness analysis is necessary in evaluating engineering projects to assure that major problems are resolved expeditiously to avoid unnecessary expenditure, and to optimize the benefits of the project per dollar expended as implementation

proceeds. Recently water quality control laws and regulatory agencies have begun to require formal cost-effectiveness analyses as a condition for governmental financial assistance for water quality control projects.

In the case of San Francisco, the State Water Resources Control Board and the Environmental Protection Agency have placed the following condition on approval of a grant for construction of waste collection and treatment facilities:

"The Municipality shall by April 1, 1973, submit a staged wet weather program whose aim shall be to eliminate the discharge of untreated wastewater to the aquatic environment...consideration of Stage I improvements shall include a thorough cost-effective evaluation of various alternative plans taking into account pollutant removal accomplishments, costs, impact on beneficial uses of receiving waters, and environmental impacts. A sufficient number of alternative Stage I improvement plans shall be compared and presented to display a broad range of investments."

The North Point Transporter is Implementation Program No.1 of the Stage I Improvement Plan.

In addition, the following provision of the 1972 Federal Water Pollution Control Act bases grant eligibility for wastes

containing storm waters on cost-effectiveness analysis:

"... 'treatment works' means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, or industrial waste, including waste in combined storm water and sanitary sewer systems. Any application for construction grants which includes wholly or in part such methods or systems shall... contain adequate data and analysis demonstrating such proposal to be, over the life of such works, the most cost efficient alternative..."

A formal cost-effectiveness analysis provides assurance to governmental agencies and the public that funds are being invested in projects that will provide the maximum benefit.

#### Basic Alternatives

Numerous alternate routes and approaches were considered to accomplish the goals of the project. However, many were eliminated in cursory comparisons because of inconsistencies with regulatory requirements or obviously inferior cost-effect relationships.

Factors or restrictions leading to early elimination of several alternative facility configurations included:

- Extremely high project costs
- Extreme disruption of normal urban activity
- Operation and maintenance problems

- Land use restrictions

#### Benefits Which Can Be Accrued From Completion Of The Project

- Reduction of health hazard to swimmers and other beach and coastal water users
- Improved aesthetics of water bodies and shoreline areas
- Protection of the aquatic environment

The degree of benefit is related to level of control, receiving water condition, public exposure to wastes, public use of the waters, value of the aquatic environment, and other factors.

Some benefit-related parameters which can be used as a measure of project effectiveness are:

- Days per year aesthetics are impaired
- Miles of contaminated or polluted beaches
- Days per year water is safe for swimming
- Number of people adversely affected
- Receiving water quality for physical and chemical parameters
- Diversity, number, and health of aquatic species

The optimum cost-effectiveness comparison results when effectiveness can be quantified. To obtain sufficient data for comparison, control parameters are normally used. Benefits are difficult to quantify and frequently the data obtained are based on qualitative observations.

The major difficulty in applying benefit parameters as a measure of effectiveness results from the predictive nature of cost-effect analyses. Quantifying benefit parameters from measured or observed data is difficult, but numerically defining the benefit resulting from various facility configurations is much more complex.

It is assumed that the benefits to be obtained by the Best Apparent Method, and all Alternative Route/Schemes, are identical. Therefore, a comparison of the various schemes was made to determine the least expensive method.

This evaluation was conducted employing the following criteria and assumptions for each alternative:

- System capacity of 114 MGD instantaneous flow rate
- Force main size 66-inch diameter
- Work south of Channel and Seventh Streets is common to all alternatives
- Manning's friction co-efficient ( $N = 0.013$ ) for concrete pipe will be used for energy calculations
- A typical section of 66-inch force main, installed by open-cut trenching, will be covered by 7-feet of backfill
- In soft Bay mud areas, trenches will be over-excavated 3-feet, and the force main will be laid in a gravel bed
- Piles under the force main will not be required for underground sections

TABLE VI

NORTH POINT CROSSTOWN TRANSPORT PROJECT  
ECONOMICS BASED ON NEW CRITERIA\*  
1975 - 1976 DOLLARS ENR 2500  
 (COST IN MILLION OF DOLLARS)

Capital Costs	Best Apparent	Embarcadero	Tunnel	Inland	Remote 5th
Force Mains	11.3	20.3	22.3	30.0	18.0 (10.2+7.8) **
114 MGD Pump Sta.	8.0	8.0	8.0	8.0	8.0
33 MGD Pump Sta.	4.0	N/A	N/A	N/A	4.0
Right of Way	0.8	0.7	0.8	0.8	0.8
Total Project	24.1	29.0	31.0	38.8	30.8

\* New Criteria - Single 66" diameter Force Main, 7' cover over main, piles not required.

\*\* 10.2 Includes Cost of Gravity Main in 5th Street

N/A - Not Applicable





- All trench work and tunneling will be done under City streets or within easements
- Trench sides will be vertical and shored as required by law

A comparison of all alternatives determined the "Best Apparent Method" least expensive and, therefore, most cost-effective. Table VI compares total project costs of the Best Apparent Method and all alternatives.

## SUMMARY OF COMMENTS RECEIVED

### Draft EIR/EIS Implementation Program No. 1

Comments by Mr. Leland S. Meyerzone - Representing Central City Coalition at the April 22, 1974 Public Hearing.

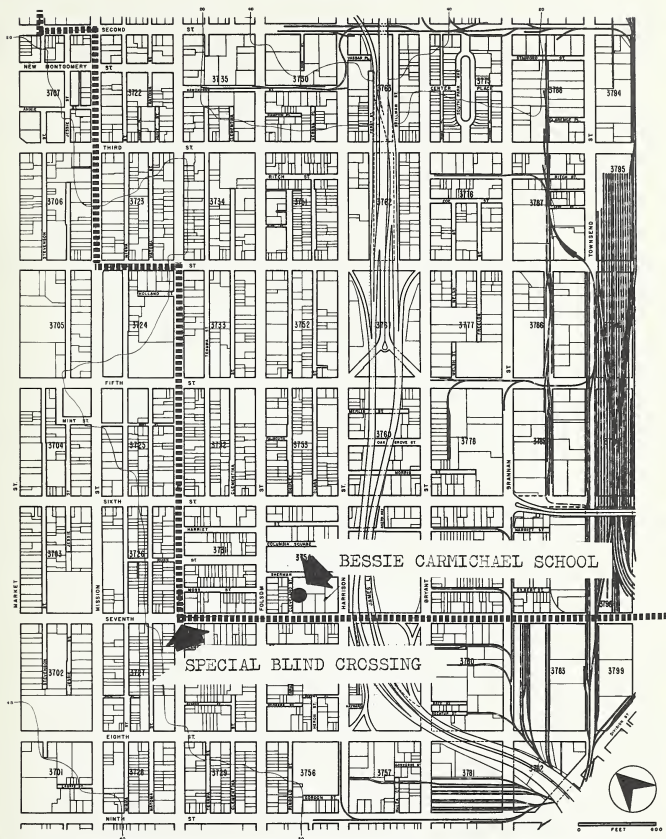
Comment: The EIR/EIS fails to mention two schools in the area, one of which is located one block away from the corner of Seventh and Howard where construction for the project will be taking place.

Response: The attached map (Supplemental Fig. 1) indicates the location of the school in question, Bessie Carmichael, located on Cleveland Street between Sherman Street and Seventh Street, and the Transporter route adjacent to it. Construction along this segment of the Transporter route is to be open-cut or trench type of construction. Mitigation measures proposed at this location are identical to those for all open cut construction and include: rigid shoring of all trenches, erection of barricades, provision of pedestrian walkways, etc. Additionally, this segment can be scheduled for the summer months, reducing the likelihood of large crowds of children traversing the site daily.

Comment: The impact report does not acknowledge the presence of a significant permanent resident population within the project area.

Response: Although the predominant land uses South of Market are commercial and industrial, a resident population is also present. Supplemental Figure II indicates the population

# SUPPLEMENTAL FIGURE 1



SOUTH OF MARKET AREA

XXXXXXXXXXXXXXXXXXXX

FORCE MAIN ALIGNMENT



distribution of a number of blocks in the South of Market area and is the product of a survey conducted by a staff member of the City Planning Department.

Comment: Pedestrian traffic in the area, including children attending school at St. Joseph's on Eleventh Street, mandates concern for good crossing at intersections.

Response: See page 43.

Comment: We would prefer having the work done on Fifth Street instead of Seventh. It appears the sole criterion for choice was vehicular traffic convenience, thereby biasing the decisions toward the convenience of commuters and tourists to the detriment of immediate residents of the area.

Response: Several factors other than traffic were considered in the decision making process, among these were:

- (a) Economic - By modifying the existent sewer system and locating the pump station at Channel and Seventh, the best apparent method saves approximately \$5 million from the costs of a Fifth Street alignment.
- (b) Siting Considerations - In addition to the previously discussed traffic problems associated with a Fifth Street alignment, significant utility disruptions would occur. Because the plan is committed to gravity flow wherever possible in order to conserve future energy requirements, a Fifth Street alignment would necessitate a trench 15 foot wide and up to 20 foot deep. Despite such deep alignments, conflicts with PG&E could not be

avoided and an electrical distribution facility recently installed for BART would have to be relocated at a cost of approximately \$3/4 million.

Additionally, this alignment would require crossing under the Southern Pacific Railroad tracks at an estimated cost of \$1/3 million.

- (c) Channel Crossing - Utilization of the Seventh Street alignment permitted location of the pump station at Seventh and Channel, thereby avoiding an over-water crossing of the channel. Additionally, it permitted selection of the most desirable site for pump station construction.

Comment: The corner of Seventh and Howard is a corner designed specifically for crossing by blind persons.

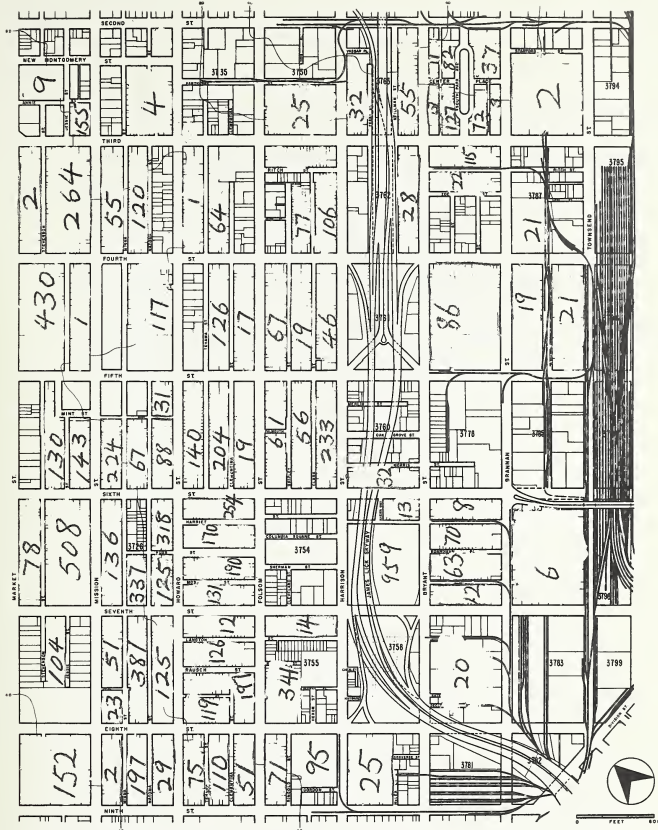
Response: Construction through this intersection will be conducted underground to prevent disruption of this protected crossing.

Written comments by:

California Department of Parks and Recreation

Comment: The project may have an effect on a site on the National Register of Historical Places, the Jackson Square Historic District bounded by Sansome, Columbus, Kearny, Pacific and Broadway Streets.

Response: One block of the Transporter segment along Sansome Street passes along the boundary of the indicated site. This section of the transporter will be installed within an



# WORKING AREA LAND USE STUDY

SOUTH OF MARKET

WORKING AREA X - PLANNING AREA 2

SUPPLEMENTAL FIGURE II



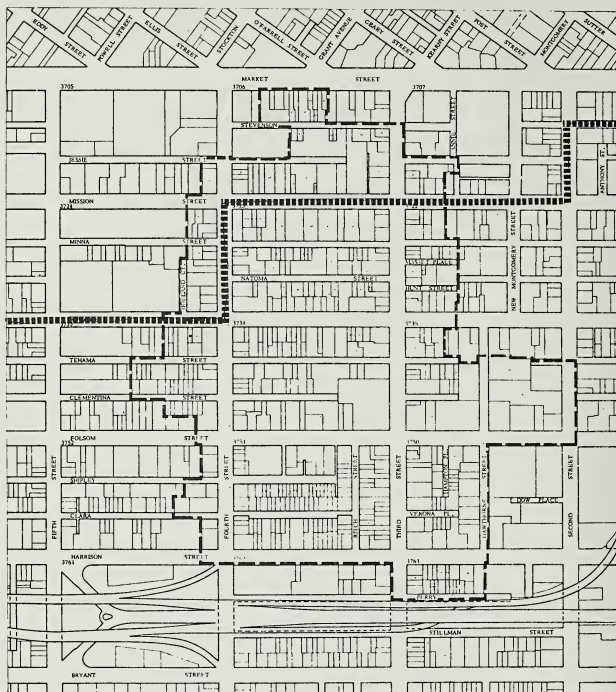


existing sewer and will require minimal street excavation which is not anticipated to affect the adjacent historic site.

A portion of the North Point transporter route passes through the Yerba Buena Center Project area.

Supplemental Figure 3 depicts the project area boundaries and the force main alignment through it.

# YERBA BUENA CENTER PROJECT



■■■■■■■■■■■■■■■■■■■■ FORCE MAIN ALIGNMENT

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## BIBLIOGRAPHY

- Woodward-Lundgren & Associates - Consulting Engineers and Geologists  
Geotechnical Investigation For The Proposed North Point  
Crosstown Transport System · Channel Pump Station To  
Southeast Plant · San Francisco June 1973
- Department of Public Works, Bureau of Engineering, Division of  
Sanitary Engineering  
North Point Transport System Study · City and County Of  
San Francisco August 1972
- Department of Public Works, Bureau of Engineering, Division of  
Sanitary Engineering  
North Point Transport System Technical Report #1 · City and  
County of San Francisco October 1973
- City and County of San Francisco, Department of City Planning  
The Comprehensive Plan Transportation April 27, 1972
- Woodward-Lundgren & Associates - Consulting Engineers and Geologists  
Geology, Seismicity and Earthquake Effects · San Francisco  
Waste Water Master Plan January 17, 1974
- Dames and Moore  
Report-Soils Investigation - North Point Crosstown Transport  
System From North Point Sewage Treatment Plant To Chestnut  
And Montgomery Streets For The City and County of San Francisco  
October 17, 1973
- Dames and Moore  
Report Soils Investigation - North Point Crosstown Transport  
System From Junction Structure at Howard and Fifth Streets  
to Berry Street Near Sixth Street For The City and County of  
San Francisco October 17, 1973
- Bechtel Incorporated  
Prefeasibility Study - Sewer Tunnel Project For the City of  
San Francisco May 1970
- Henry J. Degenkolb  
Earthquake Forces on Tall Structures
- City and County of San Francisco - Department of City Planning  
Northern Waterfront: The Comprehensive Plan
- City and County of San Francisco - Department of City Planning  
Urban Design: The Comprehensive Plan
- City and County of San Francisco - Department of City Planning  
Recreation's Open Space: The Comprehensive Plan

City and County of San Francisco - Department of City Planning  
Residence: The Comprehensive Plan



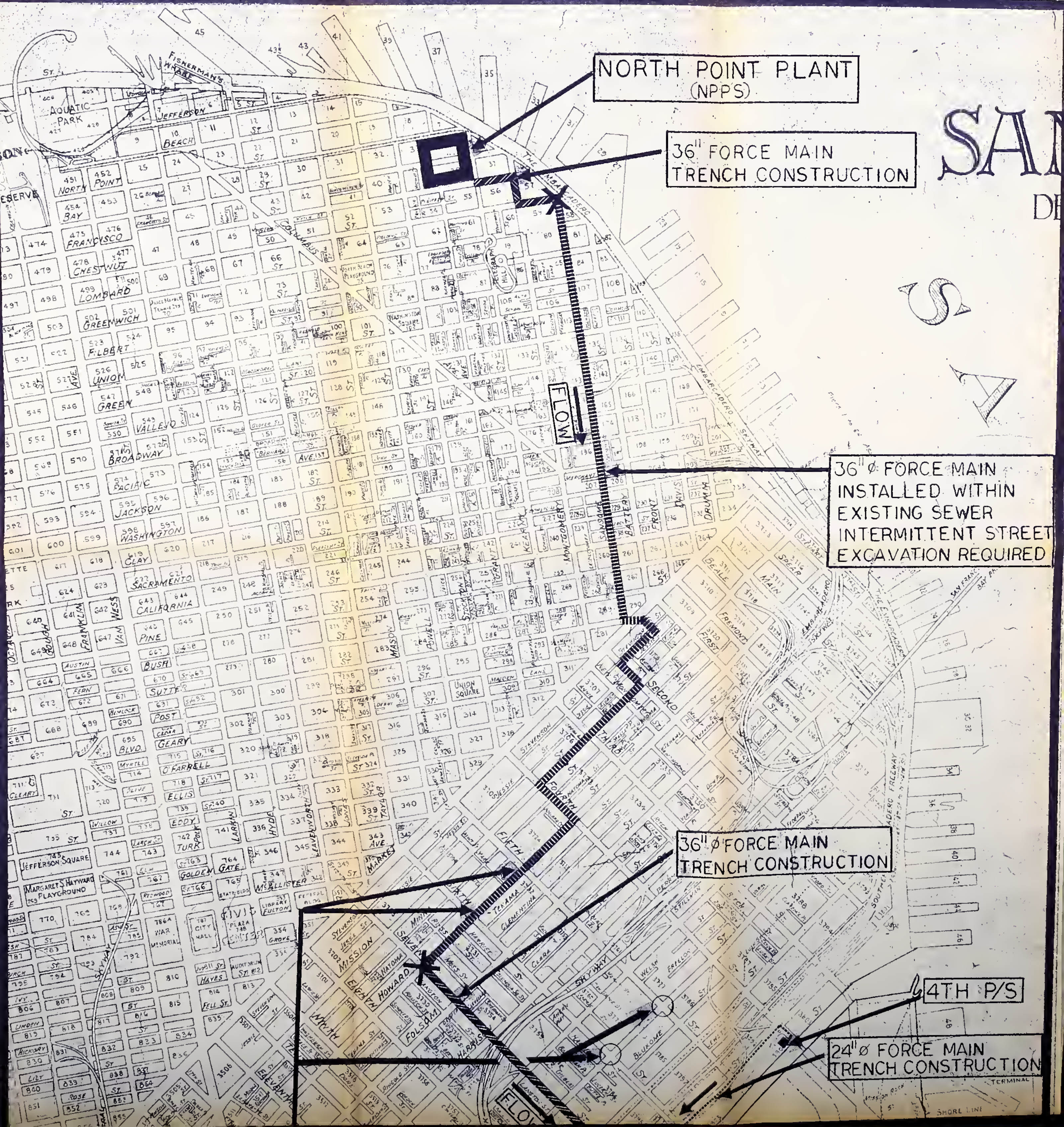












NORTH POINT PLANT  
(NPPS)

36" FORCE MAIN  
TRENCH CONSTRUCTION

36" Ø FORCE MAIN  
INSTALLED WITHIN  
EXISTING SEWER  
INTERMITTENT STREET  
EXCAVATION REQUIRED

36" Ø FORCE MAIN  
TRENCH CONSTRUCTION

4TH P/S

24" Ø FORCE MAIN  
TRENCH CONSTRUCTION







CHANNEL PUMPING STATION

STREET EXCAVATIONS  
REQUIRED

CENTRAL  
BASIN

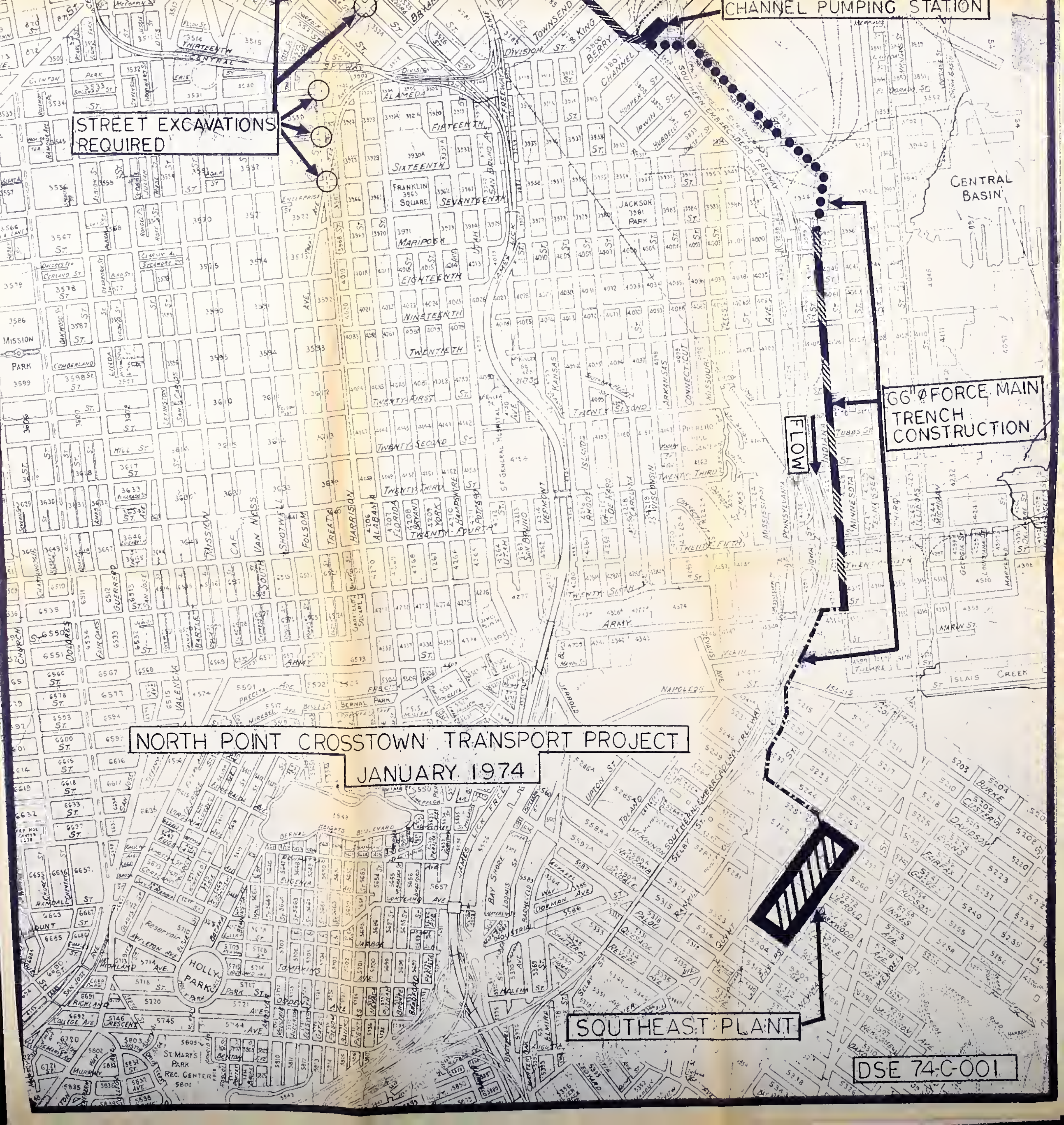
66" FORCE MAIN  
TRENCH  
CONSTRUCTION

FLOW

NORTH POINT CROSTOWN TRANSPORT PROJECT  
JANUARY 1974

SOUTHEAST PLANT

DSE 74-C-001









NORTH POINT CROSSTOWN TRANSPORT  
BEST POSSIBLE ALTERNATIVES  
MARCH 1974

WORK  
COMMON  
TO ALL  
ALTERNATIVES

LEGEND

- TWO 5'-0" FORCE MAINS - EMBARCADERO
- TWO 5'-0" FORCE MAINS - TUNNEL
- TWO 5'-0" FORCE MAINS - INLAND
- 8'-0" GRAVITY MAIN TO REMOTE PUMP STATION
- TWO 33" FORCE MAINS WITHIN NORTH POINT MAIN
- ⊗ HIGH POINT - OFFICIAL GRADE
- ② ALTERNATE NUMBER

SOUTHEAST PLANT

NPWPCP - CROSSTOWN FORCE MAIN

PLATE

CITY AND COUNTY OF SAN FRANCISCO  
DEPARTMENT OF PUBLIC WORKS - BUREAU OF ENGINEERING

DSE 72C-098







# NORTH POINT PLANT

